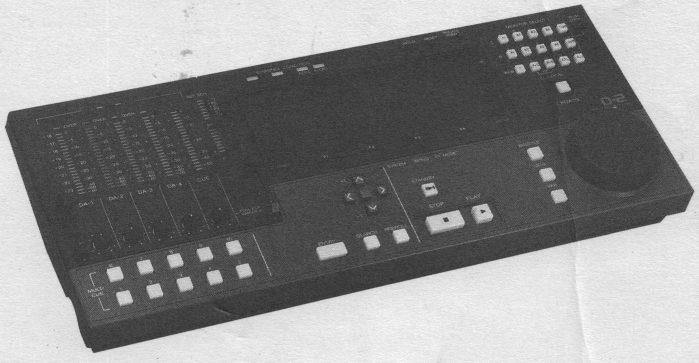
SONY

CONTROL PANEL

BKDV-202



D-2

Composite Digital

MAINTENANCE MANUAL

1st Edition

Serial No.10001 and Higher

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LE-96 Board ; Channel Condition
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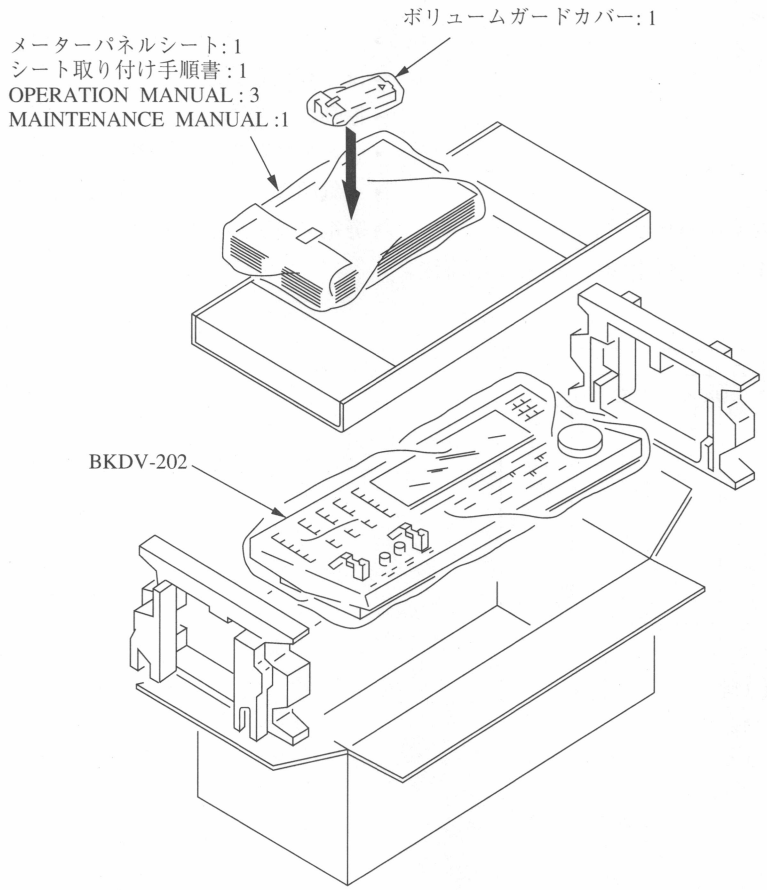
第1章
設　置

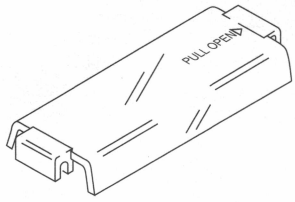
BKDV-202はD-2フォーマットデジタルカセットプレイヤー (DVR-P20, DVR-P28) に使用するコントロールパネルです。
取り扱い操作についてはBKDV-202のオペレーションマニュアルをご覧下さい。

1-1. 開梱と再梱包

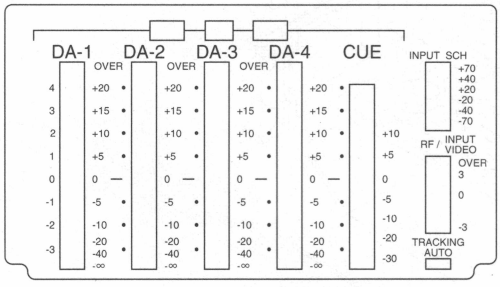


1-2. 標準付属品

ボリュームガードカバー：1個
ボリュームスイッチの誤動作防止のために、コントロールパネルを設置した後、取り付けます。



メーターパネルシート：1個
オーディオピークレベルメーターのリファレンスレベルを0 dBに変更することができます。貼付手順については同梱の手順書をご覧ください。



MAINTENANCE MANUAL：1冊
OPERATION MANUAL：3冊
取り付け手順書：1冊

1-3. 設置環境

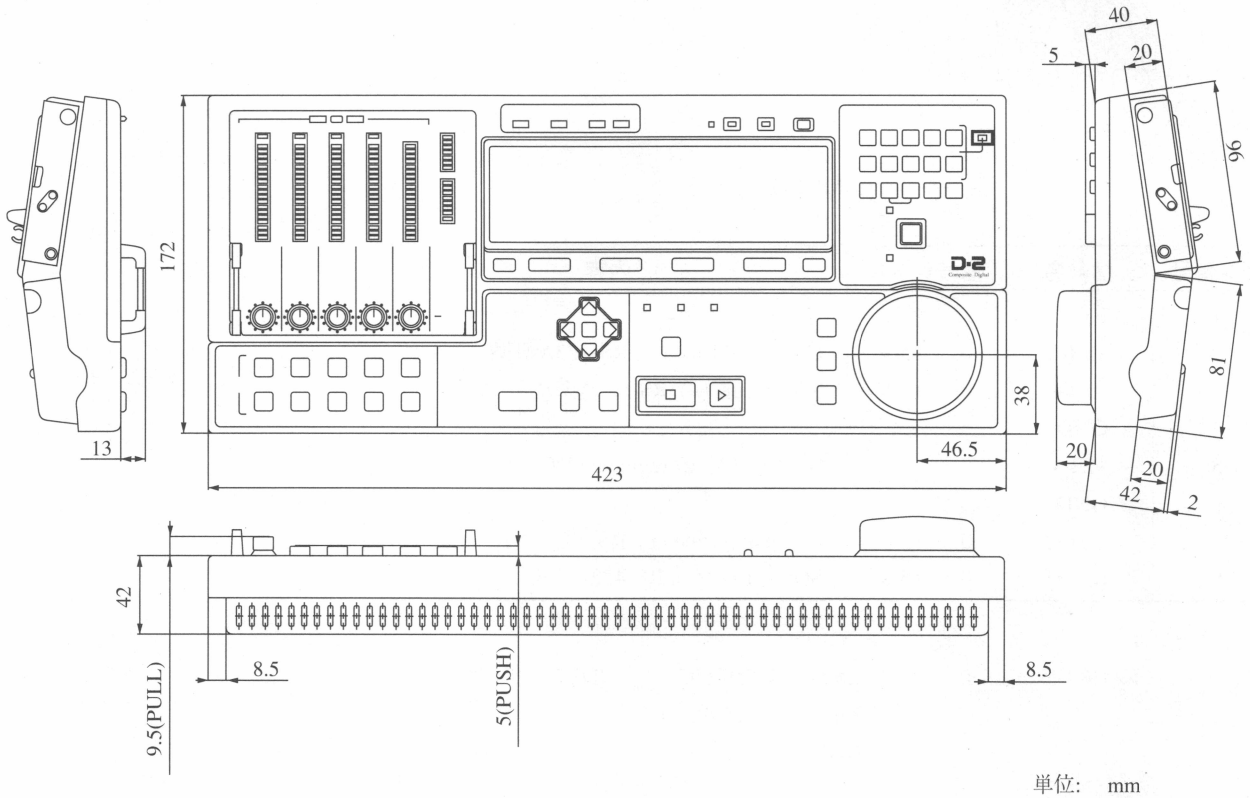
動作温度　+5℃～+40℃
保存温度　–20℃～+60℃
湿度　20％～80％ (結露状態は不可)

下記のような場所への設置は避けて下さい。

- 太陽光線や強力ライトなどが直接当る場所
- ほこりの多い場所
- 振動のある場所
- 強電界や強磁界の場所
- 電気的なノイズの多い場所
- 静電ノイズの発生し易い場所

1-4. 外形寸法及び重量

(1) 外形寸法



単位: mm

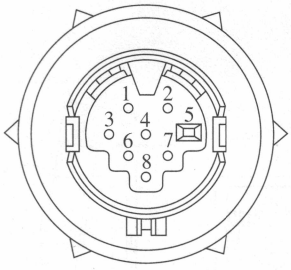
(2) 重量 : 2.5 kg

1-5. プレイヤーへの取り付け

コントロールパネルの取り付け方法はプレイヤーのメンテナンスマニュアルをご覧下さい。

1-6. コネクター入出力信号

— OUTSIDE VIEW —



MULTI 8 pin

ピン番号	信号名	信号レベル	内容
1	F.G.		フレームグランド
2	Tx (–)	0 ～ +5 V	Command Line (–), RS-422A準拠
3	Rx (+)	0 ～ +5 V	Status Line (+), RS-422A準拠
4	GND		
5	+22 V		電源 +22 V Unregulated DC, 最大2A
6	GND		
7	Tx (+)	0 ～ +5 V	Command Line (+), RS-422A準拠
8	Rx (–)	0 ～ +5 V	Status Line (–), RS-422A準拠

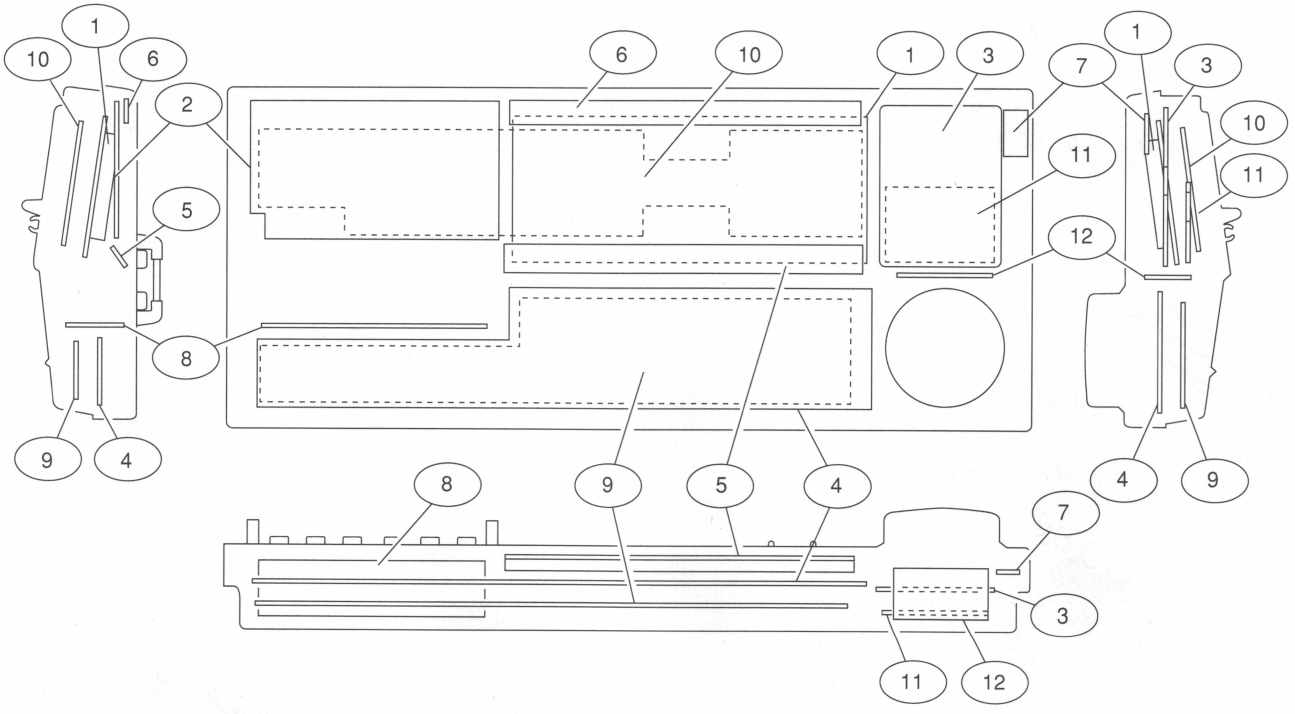
• 適合ケーブル

コントロールパネルケーブル	0.8 m	1-559-692-12	(DVRに付属)
	2 m	1-559-107-11	
	10 m	1-559-936-11	

第 2 章
サービスインフォメーション

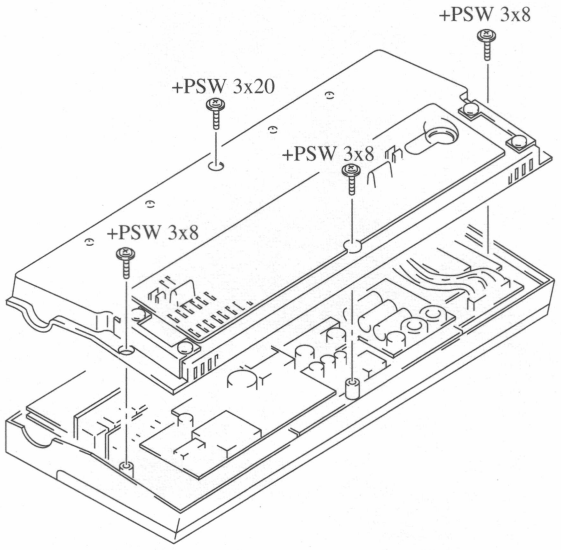
2-1. 主要部品配置図

1 FL Panel (Fluorescence Luminescent)
2 LD-44 Board: Audio Level Meter
3 SW-461 Board: Monitor Select
4 SW-462 Board: Main Switch
5 ES-03 Board: Function Switch
6 LE-96 Board: Channel Condition
7 SW-465 Board: Mode Shift Switch
8 VR-121 Board: Audio Volume
9 CP-174 Board: CPU
10 CP-178 Board: CPU
11 CN-544 Board: 8 pin Connector
12 DET-11 Board: Switch Dial Detector



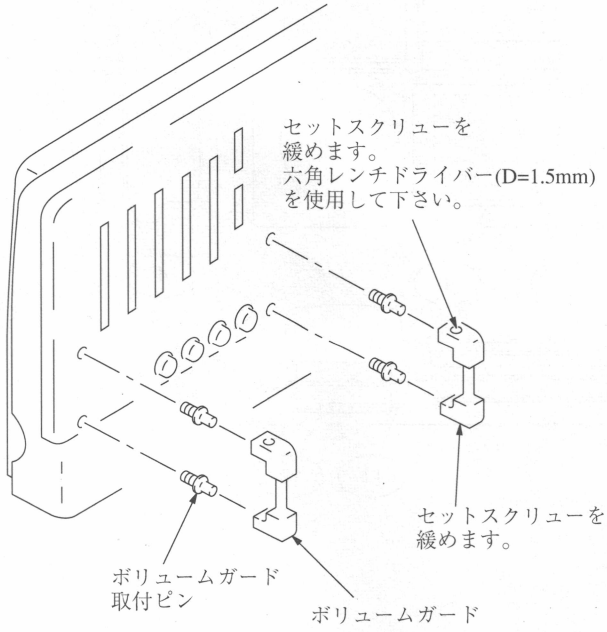
2-2. 底板の外し方

図に示すねじ4個 (+PSW 3x8, +PSW 3x20) を外し、底板を外します。



2-3. ボリュームガードの取り外し

ボリュームガードカバーを取り付けない時はボリュームガードを取り外すことができます。



2-4. 主要部品の交換

2-4-1. FLパネルの交換

ブロック交換部品です。故障した場合には分解せずに故障内容を明記して修理依頼してください。内部に高圧部分がありますので、絶対に分解しないでください。

(1) 底板を外します。(2-2項参照)
(2) 図1に示すCP-178基板のコネクタCN503, 504を外します。そして、FLパネルのコネクタCN1, 2を外します。
(3) ねじ8本 (+PSW 3x6) を外し、CP-178基板を外します。
(4) ねじ4本 (+PSW 3x8) を外し、FLパネルを外します。(図2参照)
(5) 新しいFLパネルを (2) から (4) の逆の手順で取り付け、底板を取り付けます。

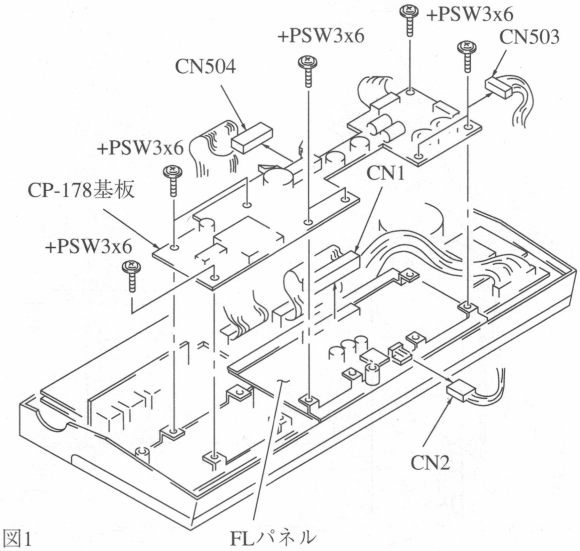


図1

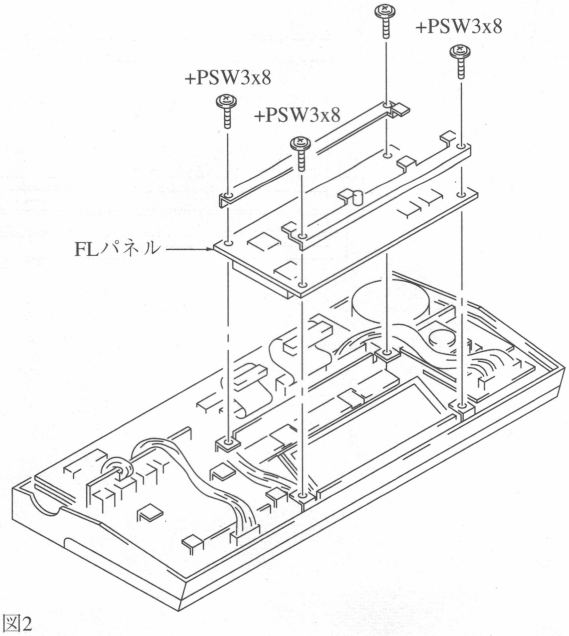


図2

2-4-2. ボリュームスイッチ基板 (VR-121基板) の交換

(1) パネル前面よりボリュームつまみ5個を引き抜きます。
(2) 底板を外します。(2-2項参照)
(3) CP-178基板を外します。(2-4-1項参照)

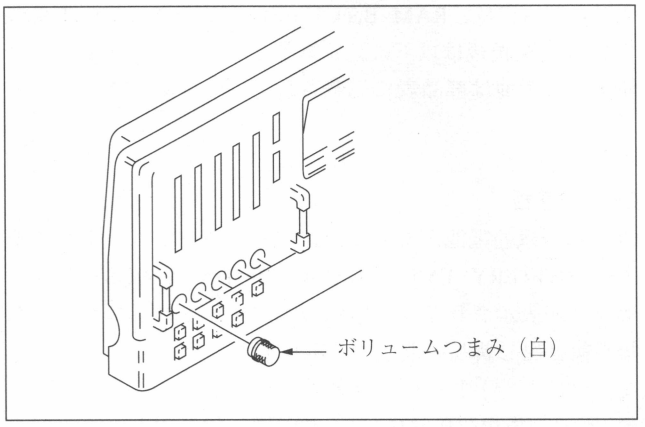


図1

(4) 図2に示すLD-44基板のコネクタCN516を外します。
(5) VR-121基板のコネクタCN517 (2ケ所) を外します。
(6) 図2に示すねじ2本を外し、SW組立を外します。

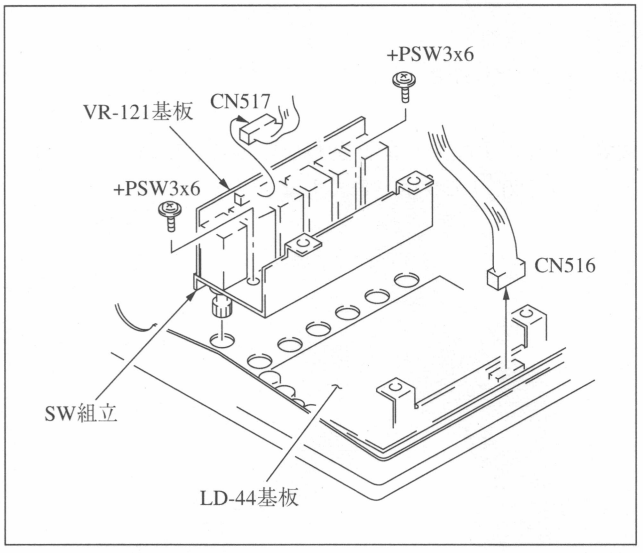


図2

(7) ナット5個 (付属ワッシャ含む) を外し、VR-121基板を外します。(図3参照)
(8) 必要な部品 (基板やボリュームスイッチ) を交換します。
(9) ステップ (1) から (7) の逆の手順を行い、SW組立を取り付けます。

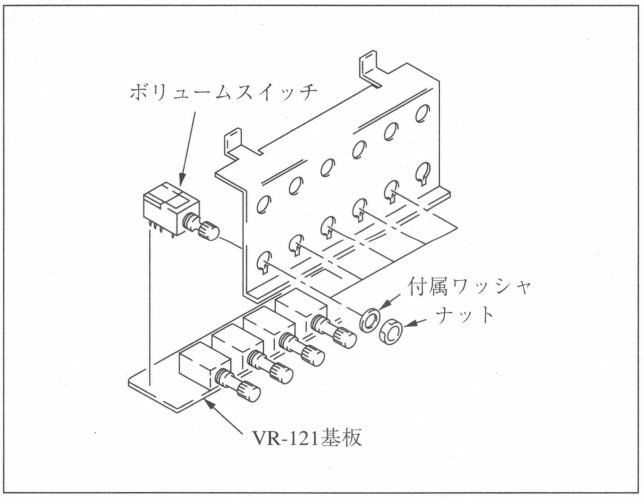


図3

2-4-3. バックアップ電池の交換方法

下記の基板には、RAM Back Up電池が装着されていますので交換時/交換後は以下に続く処置をして下さい。
使用する電池は部品表に記載されている部品を使用して下さい。

CP-178基板

CP-178基板の電池が寿命近くになるとコントロールパネル上に"BATTERY EMPTY/BACK UP DATA LOST"のメッセージが表示されます。本体の電源をオフにしてから、基板を抜き出し新しい電池と交換します。
交換は以下の手順で行ないます。

① 電池交換中のRAMのデータ破壊を防止するため、ジャンパースイッチJP1をBBからCCにします (JP1はバックアップコンデンサー側になります)。
② 素早く電池を交換します。
③ JP1をCCからBBに設定をし直して下さい。

注意: 以上の手順通りに行なわない場合、RAMデータはすべて"0"リセットされてしまいます。

2-5. 補修用部品注意事項

2-5-1. 補修用部品注意事項

(1) 安全重要部品

回路図、分解図、電気部品表中、⚠ 印の部品は安全性を維持するために重要な部品です。従ってこれらの部品を交換するときには必ず指定の部品と交換して下さい。

(2) 部品の共通化

ソニーから供給される部品はセットに実装されているものと異なることがあります。これは部品の共通化、改良等によるものです。
分解図や電気部品表には現時点での共通化された部品が記載されています。

(3) 部品の変更

部品の変更に関する情報は第8章「CHANGED PARTS」を参照して下さい。

(4) 部品の在庫

部品表のSP (Supply code) 欄にoで示される部品は交換頻度が低い部品ですので在庫していないことがあり、納期が長くなることがあります。

(5) コンデンサ、インダクタ、抵抗の単位

回路図、分解図、電気部品表中、特に明記したものを除き、下記の単位は省略されています。

コンデンサ : μF
インダクタ : μH
抵抗 : Ω

2-5-2. チップ部品の交換方法

用意する工具

半田ゴテ　: 20 W程度。できれば、コテの温度を270±10℃にコントロールできる温度コントローラーをご使用下さい。

編組線　: SOLDER TAULまたは同等品
ソニー部品番号7-641-300-81

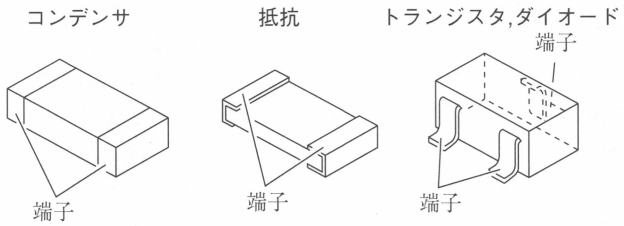
半田　: 直径0.6 mmが望ましい。

ピンセット

半田付条件

コテ温度　: 270±10℃

半田付時間　: 一端子について2秒以内にして下さい。



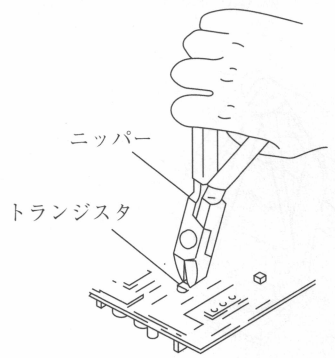
抵抗、コンデンサの交換

1. 半田ゴテの先をチップ部品の上にのせてチップ部品を加熱し、半田が溶けた状態で横にずらします。
2. 取り外した部分のパターンはがれ、隣接半田付部のダメージ、ブリッジなどがないことを確認して下さい。
3. パターンにうすく予備半田をします。
4. 新しいチップ部品をパターンにのせ、両端を半田付けして下さい。

注意: 取り外したチップ部品は再び使わないで下さい。

トランジスタ、ダイオードの交換

1. ニッパーにて部品の端子を切断します。
2. 切断した端子を半田ゴテで取り除きます。
3. 取り除いた部分のパターンはがれ、隣接半田付部のダメージ、ブリッジなどがないことを確認して下さい。
4. パターンにうすく予備半田をします。
5. 新しいチップ部品をパターンにのせ、端子を半田付けして下さい。



ICの交換

1. 編組線を使って端子の半田を取り除きます。
2. 半田ゴテで加熱しながら、ピンセットなどを使って端子を一本づつパターンから外し、ICを取り除きます。
3. 取り除いた部分のパターンはがれ、隣接半田付部のダメージ、ブリッジなどがないことを確認して下さい。
4. パターンにうすく予備半田をします。
5. 新しい部品をパターンにのせ、端子を半田付けして下さい。

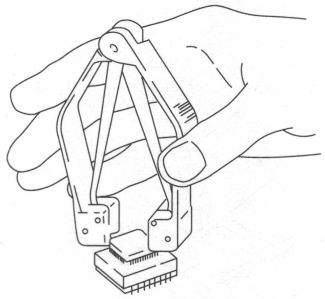
2-5-3. PLCCタイプICの交換方法

次の治具を使用して交換を行ってください。

引抜治具 (PLCCソケット用引き抜き工具)

ソニー部品番号 J-6035-070-A

ICソケットに差し込まれたIC (PLCCタイプ) を引き抜くときに便利です。
またほとんどのICピン数 (20−124ピン) に使用できます。



注意: 引き抜き工具でICチップを上方向に引っ張らないで下さい。
必要以上の力で引き抜き工具を挟み込まないで下さい。

〔使用方法〕

• ステップ1

引き抜き工具の足をICソケットのスロットの長さに合わせてください。(図1)

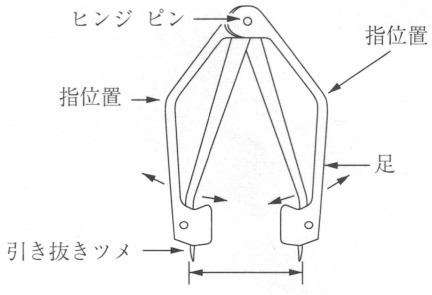


図1

• ステップ2

引き抜き工具の先端の引き抜きツメをICソケットのスロットに差込み、引き抜き工具の "A" の部分がソケットにあたるまで押し込んで下さい。

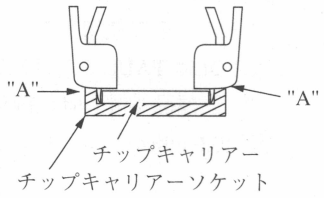


図2

• ステップ3

図3のように親指、人差指あるいは中指で引き抜き工具のリブの部分を持って下さい。ソケットには下方向に小さな力がかかります。指で引き抜き工具を挟み込むと、工具の足が伸びると同時に工具の先端のツメがICチップを掴み、上方向に引き抜きます。引き抜いた後は、指の力をゆるめれば簡単にICチップは引き抜き工具からはずれます。

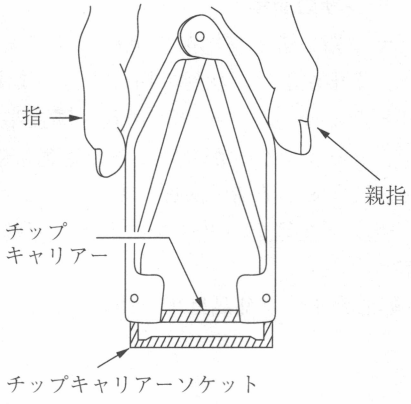


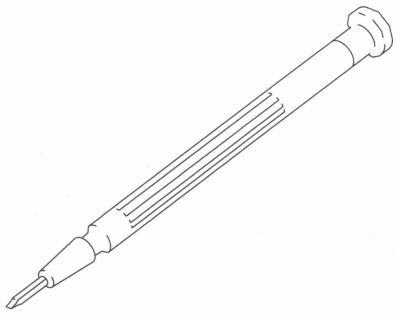
図3

2-6. 治工具及び測定器

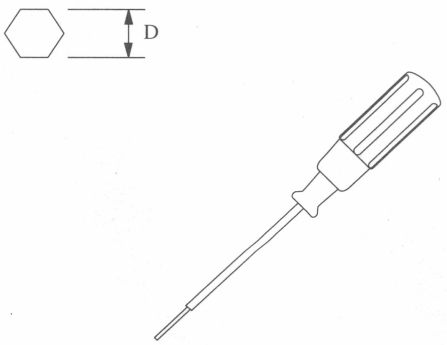
1. オシロスコープ
   相当品：2445または2465/ソニーテクトロニクス
   周波数帯域：150 MHz以上

2. デジタル電圧計
   相当品：3435A/Hewlett Packard
   有効桁数：5桁以上
   精度：0.02%、±1カウント以下

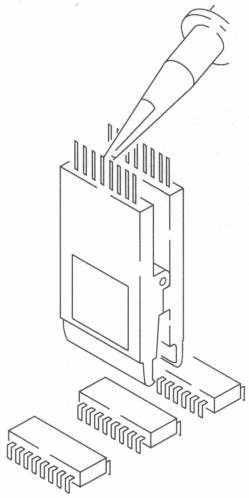
3. 調整用ドライバー 1.3 mm (セラミック)
   ソニー部品番号：7-721-052-81
   基板上のボリューム調整に使用します。



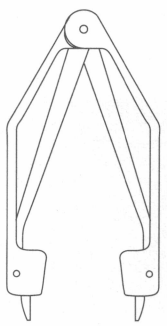
4. 六角レンチドライバー
   ソニー部品番号：D = 1.5 mm　7-700-735-00または
   J-6041-700-C
   (L レンチドライバー)



5. ICテストクリップ
   ソニー部品番号：TC-16 J-6041-770-A
   TC-20 J-6041-780-A
   チェック、調整時にDIPタイプICの足にオシロスコープのプローブをかけるのに便利です。TC-16は14ピンあるいは16ピンのDIP ICに、TC-20は18ピンあるいは20ピンのDIP ICに使用できます。



6. PLCC IC引抜治具
   ソニー部品番号：J-6035-070-A
   ICソケットに差し込まれたIC (PLCCタイプ) を引き抜くときに便利です。
   またほとんどのICのピン数 (20-124ピン) に使用できます。



第3章
調　整

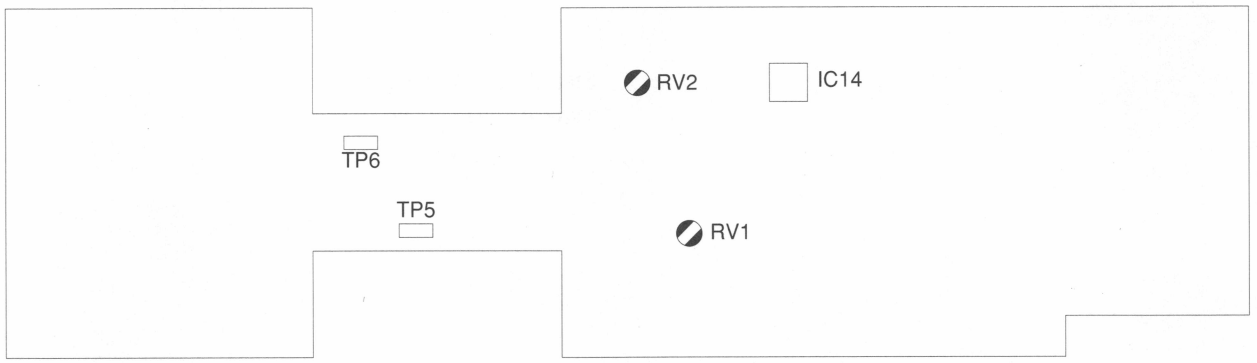
測定器

デジタル電圧計
相当品：3435A/Hewlett Packard

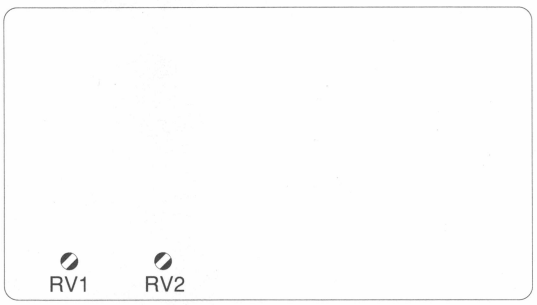
オシロスコープ
相当品：2445または2465/ソニーテクトロニクス

調整部品配置図

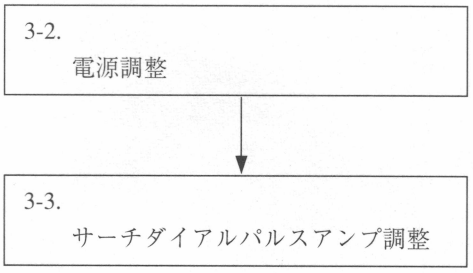
CP-178基板（部品面/A面）



DET-11基板（部品面/A面）



3-1. 調整手順



3-2. 電源調整

測定器：デジタル電圧計

下記のボリュームを交換した際には、ボリュームを次の位置にセッティングしてから調整を行って下さい。

RV1･･･反時計方向一杯
RV2･･･反時計方向一杯

Step 1. +5 V電圧調整

TP5/CP-178 = +5.20 ±0.05 Vdc
◐RV1/CP-178

Step 2. +12 V電圧調整

TP6/CP-178 = +12.00 ±0.05 Vdc
◐RV2/CP-178

3-3. サーチダイアルパルスアンプ調整

測定器：オシロスコープ

Step 1. 調整

JOGモードにし、サーチダイアルを回しながら、DET-11基板の◐RV1を左右に回します。◐RV1を左に回して行ったときにCP-178基板のIC14の14ピンにパルスが現れ始める点と、右に回して行ったときにパルスが現れ始める点との中央に、◐RV1をセットします。

Step 2.

JOGモードにし、Step 1. と同様にして、CP-178基板のIC14の13ピンに対してDET-11基板の ◐RV2を調整します。

Step 3.

サーチダイアルをFWD方向に回します。
IC14の14ピンとIC14の13ピンの位相を確認します。

14ピン/IC14/
CP-178

13ピン/IC14/
CP-178

Step 4.

サーチダイアルをREV方向に回します。
IC14の14ピンとIC14の13ピンの位相を確認します。

14ピン/IC14/
CP-178

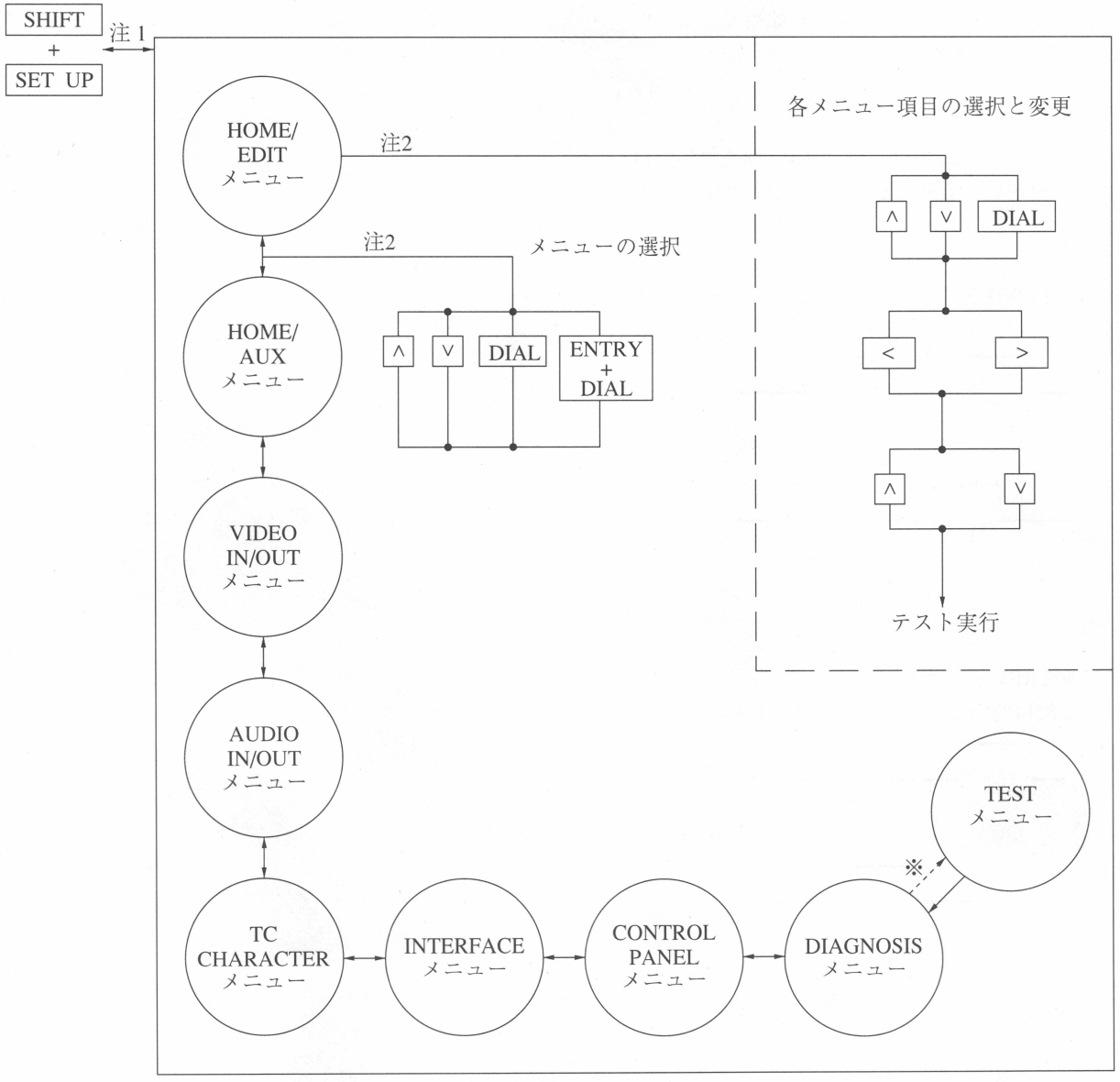
13ピン/IC14/
CP-178

3-4. テストモード

予備知識

テストモードは、本機の保守・点検および修理を行うときに必要な項目です。コントロールパネル上のキー操作により、メニュー形式で設定が出来ます。

テストモード・フローチャート

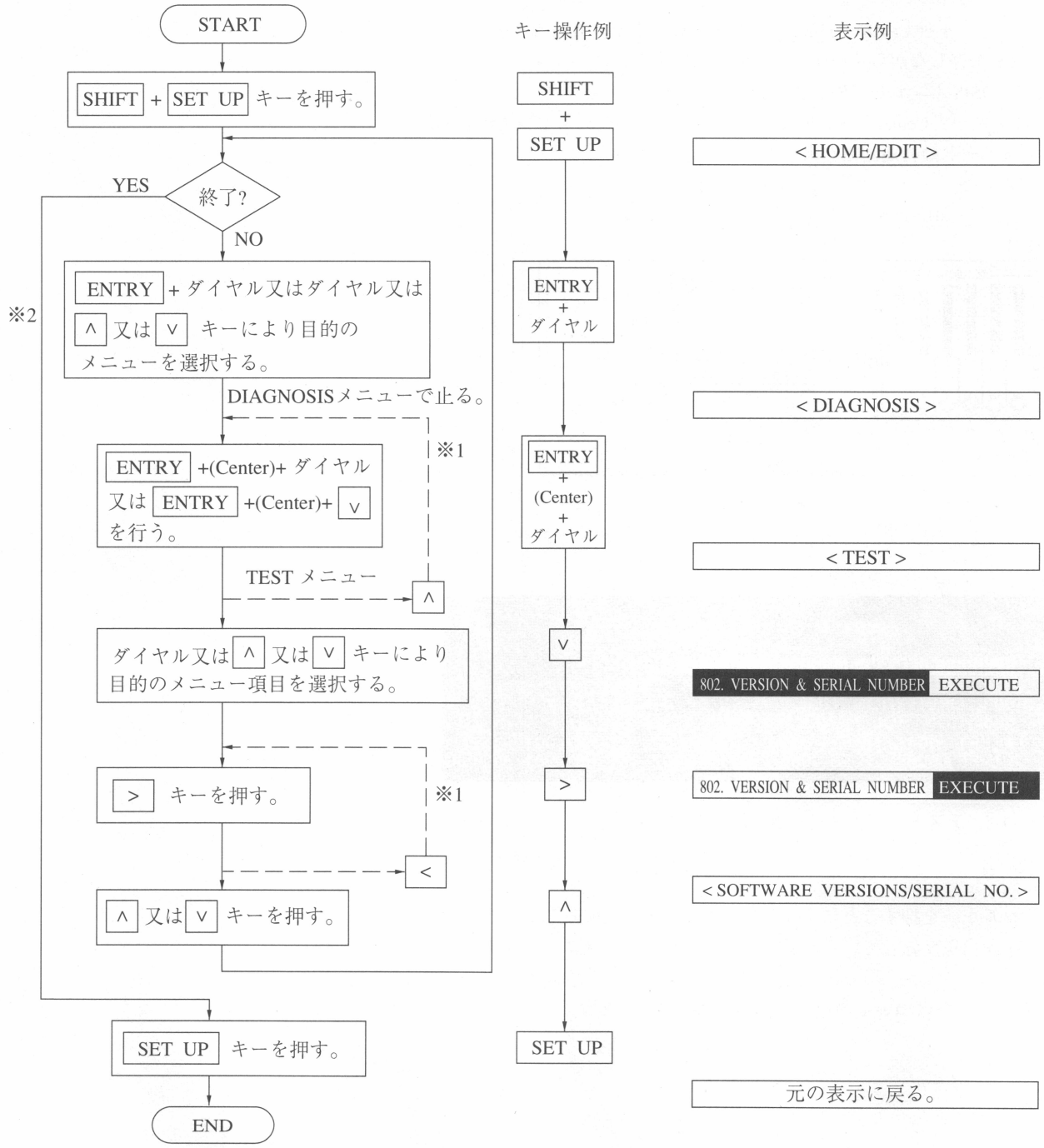


注 1： セットアップモードを解除する場合は SET UP キーを押します。この際もう1度 SHIFT + SET UP キーを押すと、解除したときのメニューに戻ります。

注 2： テストモードを含む他のメニューについても同様の手順で行います。

※ DIAGNOSIS メニューから TEST メニューへは ∧ 、∨ キーまたはダイヤルでは入れません。
(DIAGNOSIS メニューの終わりまでくるとそれ以上は進めなくなります。)
TEST メニューに入る場合は DIAGNOSIS メニューから ENTRY とカーソル (Center) の2つのキーを同時に押しながら、ダイヤルを時計方向に回すか ∨ キーを押してください。

テストメニューの操作フローおよび操作例



※1　破線中のキーを押すと図示のレベルに戻ることができます。

※2　CONTROL PANEL TEST の項目を選択してから終了する場合は、3-4-3章のステップ8を行ってください。

3-4-1. メニューモードにする手順

コントロールパネルのキーを下記の順に押します。(図3-4-1)

1. SHIFT キーを押しながら SET UP キーを押します。(Fig. 1)
2. ENTRY を押しながらサーチダイヤルを時計方向に回します。(Fig. 1)
   DIAGNOSISメニューでダイヤルが止まります。
3. ENTRY キーとCenterキーを同時に押しながらサーチダイヤルを時計方向に回します。
   テストモードの初期画面が表示されます。(Fig. 2)

Fig. 1

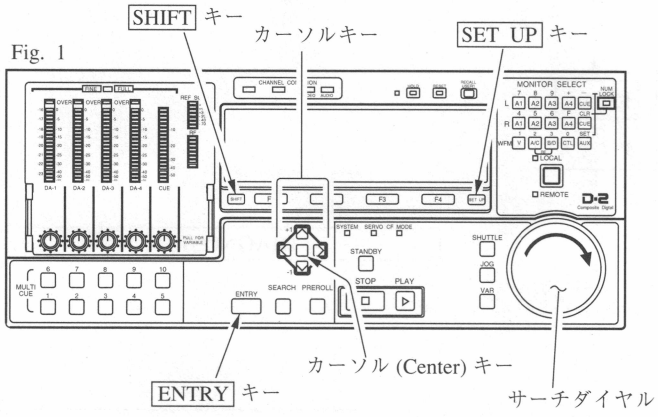


Fig. 2

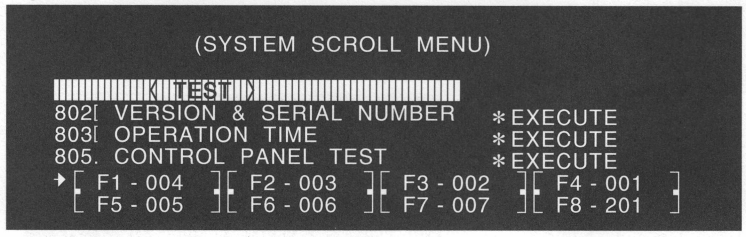


図3-4-1. テストメニューモード

4. カーソルキーを押すことにより、各メニューを選択することが出来ます。
   （文字が白黒反転している箇所が、選択されているメニューです。）

以降、各メニューについての機能と操作方法を説明します。

3-4-2. VERSION & SERIAL NUMBER メニュー

• VTRに取り付けられているROMのバージョンとシリアルNo. を表示します。VTRの点検、チェックの際に使用して下さい。

メニューモードにする手順・解除する手順

コントロールパネルのキーを下記の順に押します。(図3-4-2)

1. SHIFT + SET UP
2. ENTRY + サーチダイヤル
   DIAGNOSISメニューまでくるとダイヤルはそれ以上進まなくなります。
3. ENTRY + Center + サーチダイヤル
   TESTメニューが選択されます。(3-4-1章を参照)
4. サーチダイヤルを時計方向に回すか、またはカーソル ∨ キーを押すことにより、VERSION & SERIAL NUMBER メニューを選択します。(Fig. 1)
5. カーソル > キーを押します。: EXECUTE 部が反転します。(Fig. 2)
6. カーソル ∧ キーを押します。: ディスプレイが Fig. 3 のように表示され、各基板のROMバージョンとシリアルNo. が表示されます。
7. SET UP : VERSION & SERIAL NUMBER メニューを終了し、初期画面に戻ります。続けて他のテストメニューを選択したい場合は、もう一度 SHIFT + SET UP キーを押すとテストモードのメニュー画面に戻ることが出来ます。

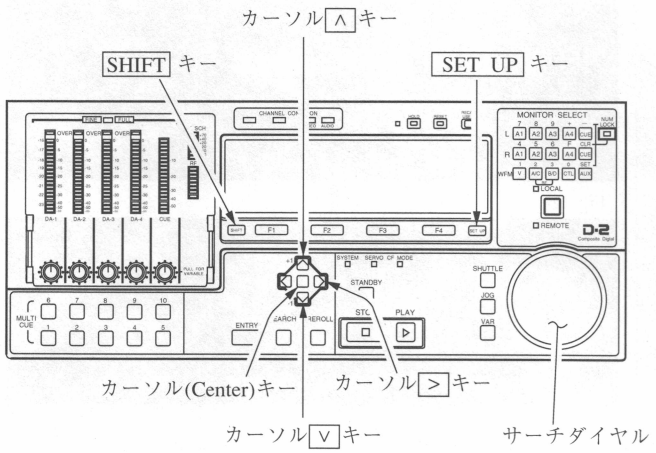


Fig. 1

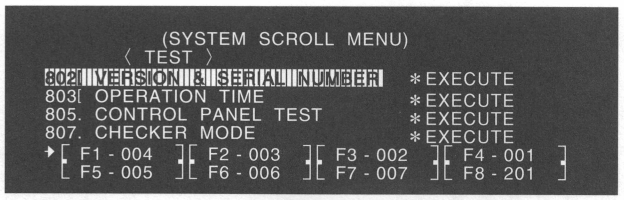
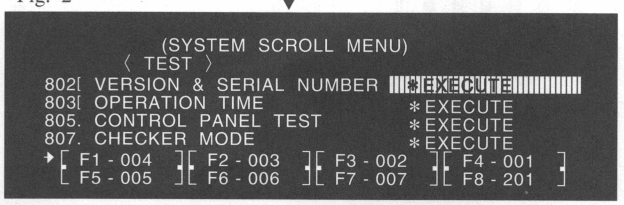

(SYSTEM SCROLL MENU)
〈 TEST 〉
802[VERSION & SERIAL NUMBER *EXECUTE
803[OPERATION TIME *EXECUTE
805. CONTROL PANEL TEST *EXECUTE
807. CHECKER MODE *EXECUTE
F1 - 004 F2 - 003 F3 - 002 F4 - 001
F5 - 005 F6 - 006 F7 - 007 F8 - 201

Fig. 2


(SYSTEM SCROLL MENU)
〈 TEST 〉
802[VERSION & SERIAL NUMBER *EXECUTE
803[OPERATION TIME *EXECUTE
805. CONTROL PANEL TEST *EXECUTE
807. CHECKER MODE *EXECUTE
F1 - 004 F2 - 003 F3 - 002 F4 - 001
F5 - 005 F6 - 006 F7 - 007 F8 - 201

注意: バージョン表示では、CPのみコントロールパネルのROMバージョンを示しています。

CP x x (CP-178 BoardのROMバージョン)
x x (CP-174 BoardのROMバージョン)

Fig. 3

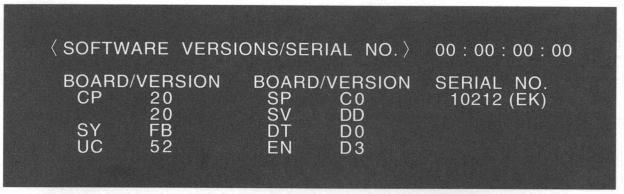

〈 SOFTWARE VERSIONS/SERIAL NO. 〉 00 : 00 : 00 : 00
BOARD/VERSION BOARD/VERSION SERIAL NO.
CP 20 SP C0 10212 (EK)
20 SV DD
SY FB DT D0
UC 52 EN D3

図3-4-2. VERSION & SERIAL NUMBER メニュー

3-4-3. CONTROL PANEL TEST メニュー

• コントロールパネルが正常に機能しているかをチェックします。

注意： 以下の例を参考にして、モニターセレクトキーの操作を行ってください。

例　　L [A1] : 1　　"L" はシートに示された列
" [A1] " はキー部に表示されたもの
" : 1" はディスプレイに出力されたもの
を示しています。

メニューモードにする手順・解除する手順 (図3-4-3)

コントロールパネルのキーを下記の順に押します。

1. [SHIFT] + [SET UP]
2. [ENTRY] + サーチダイヤル: DIAGNOSISメニューまでくるとダイヤルはそれ以上進まなくなります。
3. [ENTRY] + Center + サーチダイヤル: TESTメニューが選択されます。(3-4-1章を参照)
4. サーチダイヤルを時計方向に回すか、またはカーソル [∨] キーを押すことにより、CONTROL PANEL TEST メニューを選択します。(Fig. 1)
5. カーソル [>] キーを押します。: EXECUTE 部が反転します。(Fig. 2)
6. カーソル [∧] キーを押します。: ディスプレイが Fig. 3 のように表示されます。
7. WFM [AUX]: プロンプトの後に？が表示されます。その後にプロンプトが出力されます。

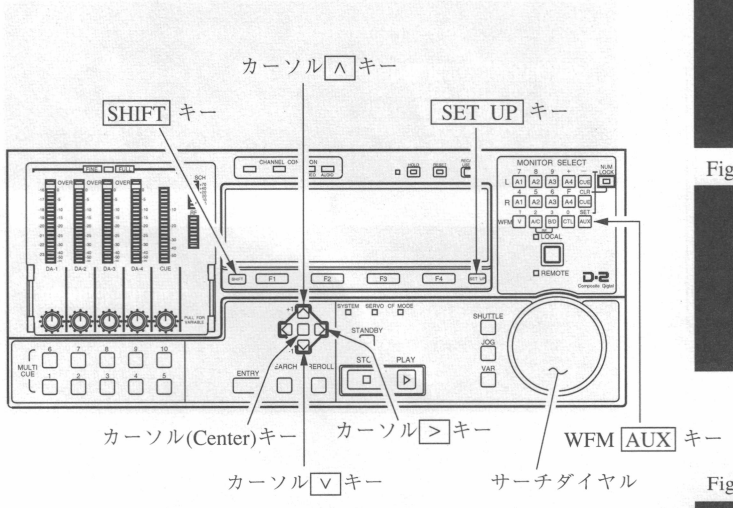


Fig. 1

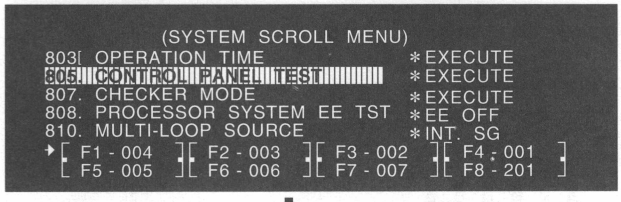


Fig. 2

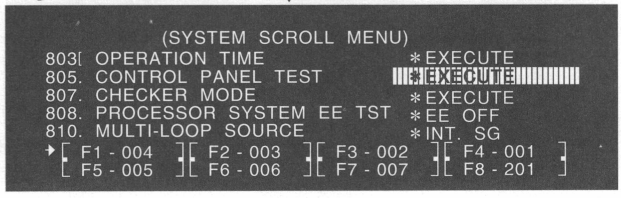


Fig. 3

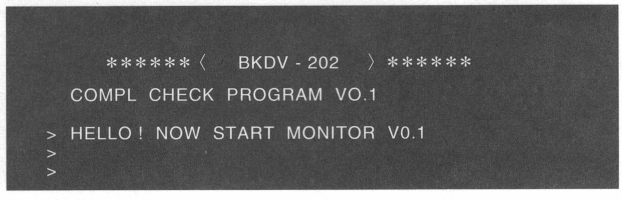


図3-4-3. CONTROL PANEL TEST メニュー

8. メニューを終了、または中断したい場合は下記の手順で初期メニュー画面に戻します。
方法1または方法2を行ってください。

図3-4-4に示すモニターセレクトキーを下記の順に押します。

方法1

❶ WFM [CTL] + WFM [AUX]
このとき、必ず先にWFM [CTL] を押してください。WFM [AUX] を先に押してもメニューは終了しません。

方法2

① SHIFTキー +R [A4] : Tが入力されます。
② SHIFTキー +L [A3] : Cが入力されます。
③ SHIFTキー +L [A4] : Dが入力されます。
④ L [A4] : 4が入力されます。
⑤ WFM [AUX] : 初期メニュー画面に戻ります。

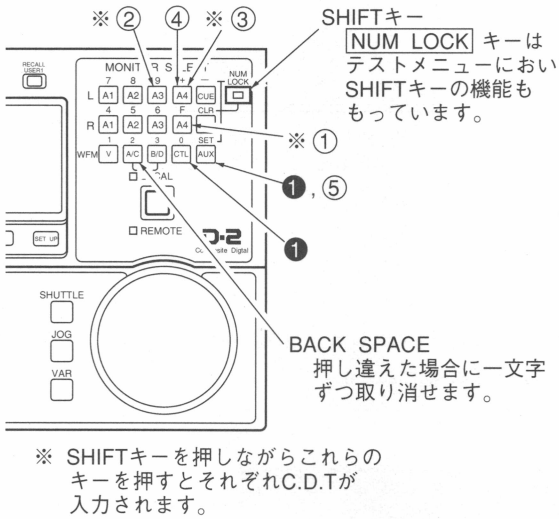


図3-4-4. CONTROL PANEL TEST メニューの終了方法

以降、コントロールパネルに取り付いている各基板ごとのチェックを行うことができます。詳細を以下の項目に記します。

(1) DISPLAY チェック
(2) SW-462 チェック
(3) SW-461 チェック
(4) LE-96 チェック
(5) SW-465 チェック
(6) LD-44 チェック
(7) VR Ass'y チェック
(8) ES-03 チェック

(1) DISPLAY チェック

1. 3-4-3章のステップ1から7を行い、CONTROL PANEL TEST メニューを選択します。
2. 図3-4-5に示すモニターセレクトキーを下記の順に押します。

① SHIFTキー +R [A4] : T
② SHIFTキー +L [A3] : C
③ SHIFTキー +L [A4] : D
④ L [A1] : 1
⑤ WFM [AUX]

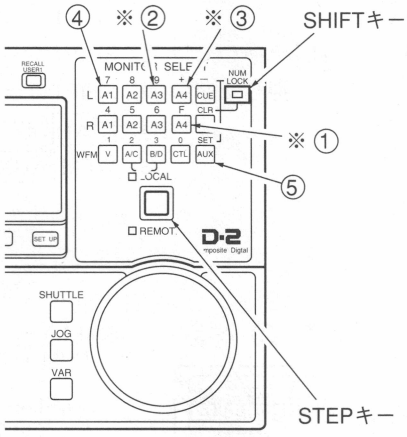


図3-4-5. DISPLAY チェック (1)

3. ディスプレイ上のDOTがすべて点灯することを確認します (図3-4-6) 。またノイズが無いことを確認します。(ただし左端4×64ラインは点灯しません。)

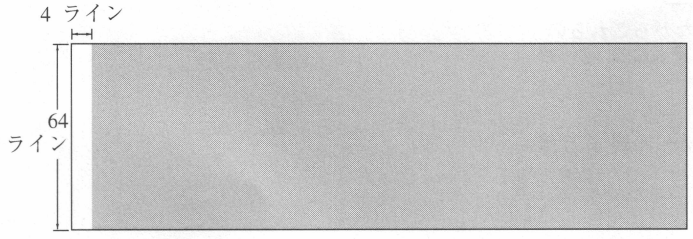


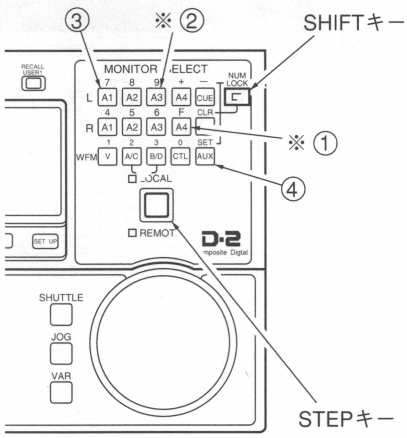
図3-4-6. DISPLAY チェック (2)

4. 確認後、モニターセレクトキーのSTEPキーを押します。
メニューを終了したい場合は、3-4-3章のステップ8を行い、初期メニュー画面に戻ることができます。

(2) SW-462 チェック

1. 3-4-3章のステップ1から6を行い、CONTROL PANEL TEST メニューを選択します。
   (1)から続けてチェックを行っているときは、ステップ2から行います。
2. 図3-4-7に示すモニターセレクトキーを下記の順に押します。

① SHIFTキー +R [A4] : T
② SHIFTキー +L [A3] : C
③ L [A1] : 1
④ WFM [AUX]



※ SHIFTキーを押しながら
これらのキーを押します。

図3-4-7. SW-462 チェック (1)

3. 図3-4-8に示すキーおよびLEDがすべて点灯することを確認します。(22ヶ所)
4. STEPキーを押します。
5. 図3-4-8に示すキーおよびLEDがすべて点滅することを確認します。(22ヶ所)
6. STEPキーを押します。
7. 図3-4-8に示すキーを1個ずつ押したとき、対応するLEDが点灯することを確認します。
   (カーソルキー5個は除く)

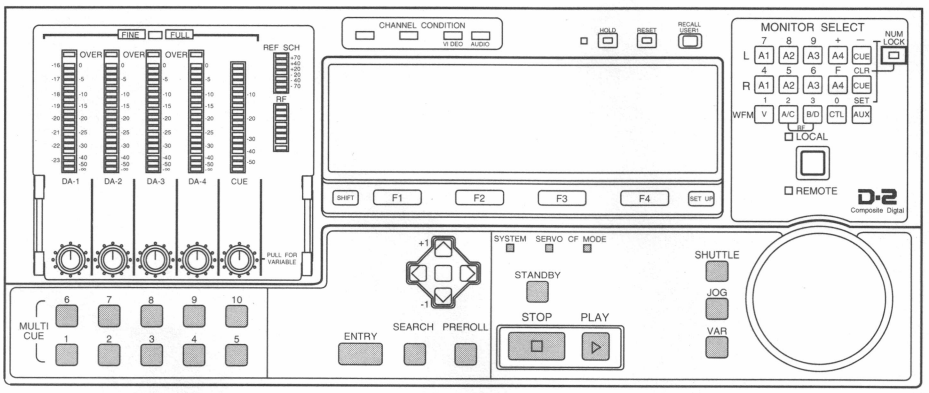


図3-4-8. SW-462チェック (2)

8. 図3-4-9に示すカーソルキーを押したとき、対応する表示がディスプレイに表示され、なおかつ対応するLEDが点灯することを確認します。

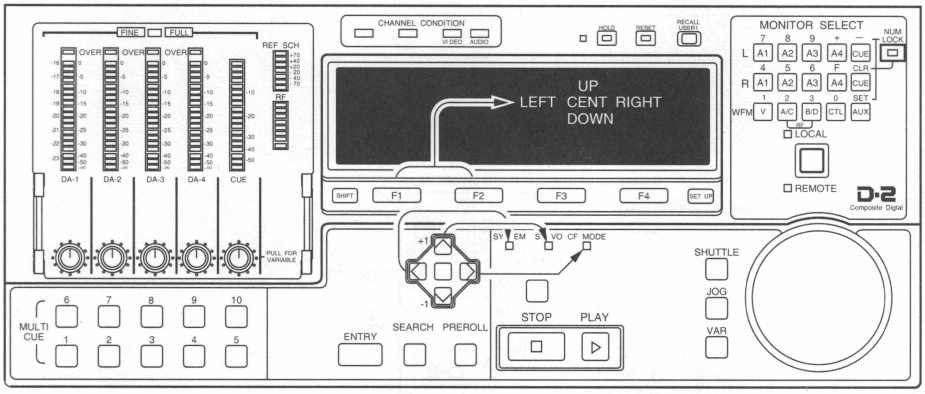


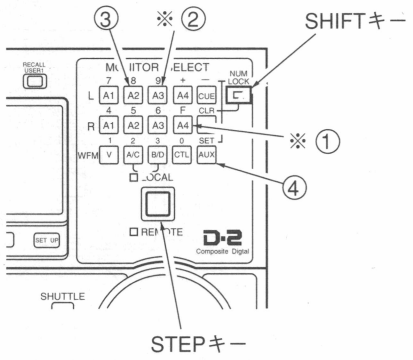
図3-4-9. SW-162 チェック (3)

9. STEPキーを押します。
メニューを終了したい場合は、3-4-3章のステップ8を行い、初期メニュー画面に戻ることができます。

(3) SW-461 チェック

1. 3-4-3章のステップ1から7を行い、CONTROL PANEL TESTメニューを選択します。
   (2)から続けてチェックを行っているときは、ステップ2から行います。
2. 図3-4-10に示すモニターセレクトキーを下記の順に押します。

① SHIFTキー +R [A4] : T
② SHIFTキー +L [A3] : C
③ L [A2] : 2
④ WFM [AUX]



※ SHIFTキーを押しながら
これらのキーを押します。

図3-4-10. SW-461 チェック (1)

3. 図3-4-11に示すキーおよびLEDがすべて点灯することを確認します。
4. STEPキーを押します。
5. 図3-4-11に示すキーおよびLEDがすべて点滅することを確認します。
6. STEPキーを押します。
7. 図3-4-11に示すキーを1個ずつ押したとき、対応するLEDが点灯することを確認します。

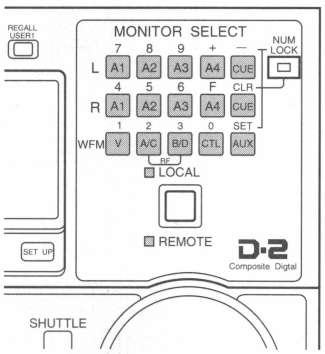


図3-4-11. SW-461 チェック (2)

8. STEPキーを押します。
   メニューを終了したい場合は、3-4-3章のステップ8を行い、初期メニュー画面に戻ることができます。

(4) LE-96 チェック

1. 3-4-3章のステップ1から7を行い、CONTROL PANEL TESTメニューを選択します。
   (3)から続けてチェックを行っているときは、ステップ2から行います。
2. 図3-4-12に示すモニターセレクトキーを下記の順に押します。

① SHIFTキー +R [A4] : T
② SHIFTキー +L [A3] : C
③ L [A3] : 3
④ WFM [AUX]

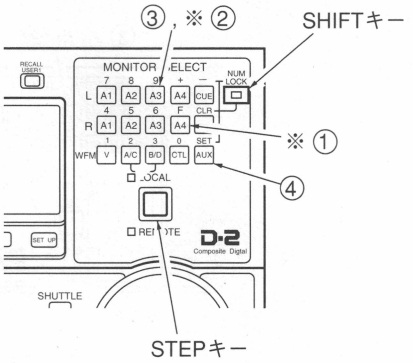


図3-4-12. LE-96 チェック (1)

3. 図3-4-13に示すLEDが1個ずつ順番に点灯することを確認します。

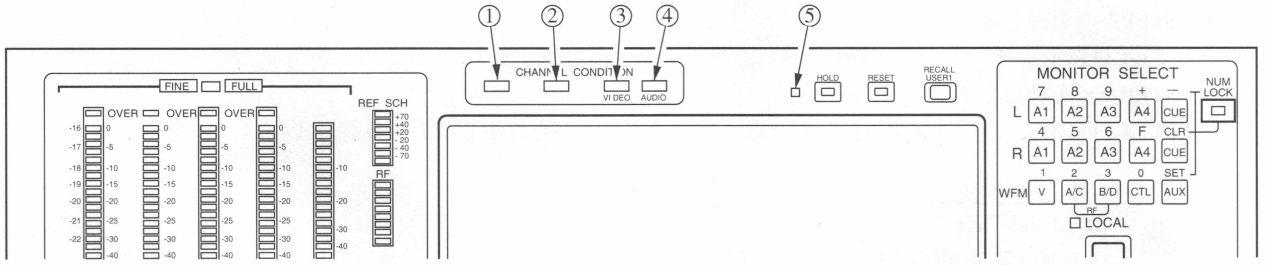


図3-4-13. LE-96 チェック (2)

4. STEPキーを押します。
5. 図3-4-14に示す各スイッチを押したとき、対応するLED が点灯することを確認します。

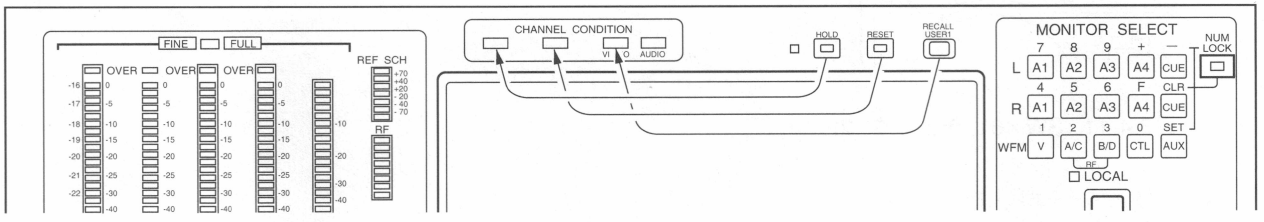


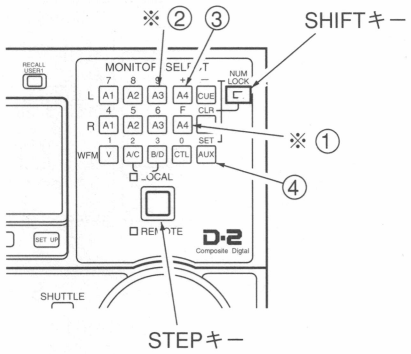
図3-4-14. LE-96 チェック (3)

6. STEPキーを押します。
   メニューを終了したい場合は、3-4-3章のステップ8を行い、初期メニュー画面に戻ることができます。

(5) SW-465 チェック

1. 3-4-3章のステップ1から7を行い、CONTROL PANEL TESTメニューを選択します。
   (4)から続けてチェックを行っているときは、ステップ2から行います。
2. 図3-4-15に示すモニターセレクトキーを下記の順に押します。

① SHIFTキー +R [A4] : T
② SHIFTキー +L [A3] : C
③ L [A4] : 4
④ WFM [AUX]



※ SHIFTキーを押しながら
これらのキーを押します。

図3-4-15. SW-465チェック (1)

3. 図3-4-16に示す [NUM LOCK] キーを押します。押している間、キーのLEDが点灯することを確認します。

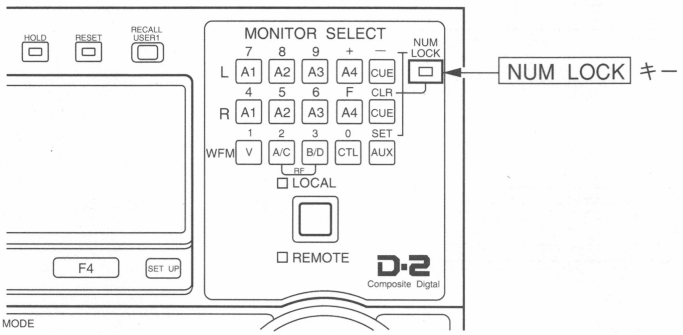


図3-4-16. SW-465 チェック (2)

4. STEPキーを押します。
   メニューを終了したい場合は、3-4-3章のステップ8を行い、初期メニュー画面に戻ることができます。

(6) LD-44 チェック

1. 3-4-3章のステップ1から7を行い、CONTROL PANEL TESTメニューを選択します。
   (5)から続けてチェックを行っているときは、ステップ2から行います。
2. 図3-4-17に示すモニターセレクトキーを下記の順に押します。

① SHIFTキー +R [A4] : T
② SHIFTキー +L [A3] : C
③ L [CUE] : 5
④ WFM [AUX]

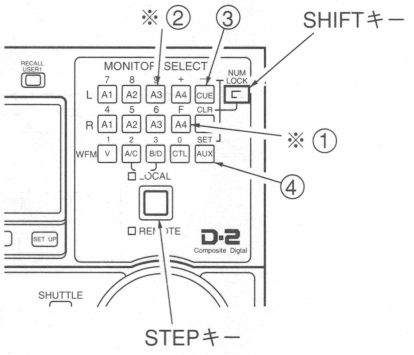


図3-4-17. LD-44 チェック (1)

3. 図3-4-18に示すLEDがすべて点灯することを確認します。
4. STEPキーを押します。
5. 図3-4-18に示すLEDが1個ずつ点灯することを確認します。 (左下方より上方向、更に右方向へ点灯していきます。)

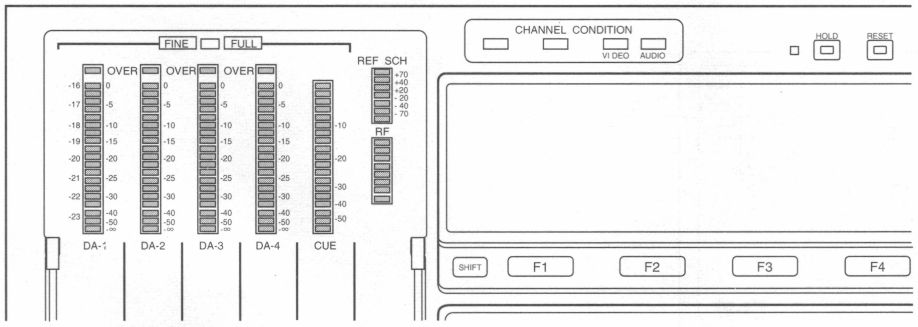


図3-4-18. LD-44 チェック (2)

6. STEPキーを押します。
7. 図3-4-19に示すスイッチを押します。押している間、スイッチの両側のLED (FINE , FULL 表示)が点灯することを確認します。

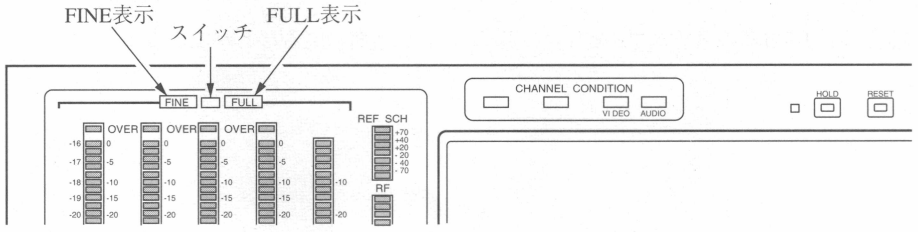


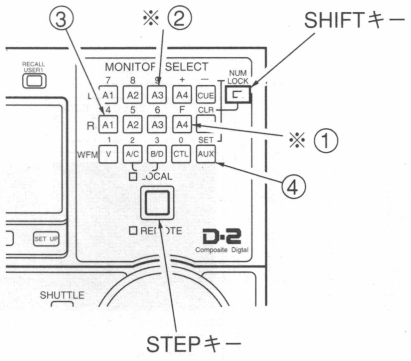
図3-4-19. LD-44 チェック (3)

8. STEPキーを押します。
   メニューを終了したい場合は、3-4-3章のステップ8を行い、初期メニュー画面に戻ることができます。

(7) VR Ass'y チェック

1. 3-4-3章のステップ1から7を行い、CONTROL PANEL TESTメニューを選択します。
   (6)から続けてチェックを行っているときは、ステップ2から行います。
2. 図3-4-20に示すモニターセレクトキーを下記の順に押します。

① SHIFTキー +R [A4] : T
② SHIFTキー +L [A3] : C
③ R [A1] : 6
④ WFM [AUX]



※ SHIFTキーを押しながら
これらのキーを押します。

図3-4-20. VR Ass'y チェック (1)

3. 図3-4-21に示すボリュームつまみをすべて反時計方向一杯に回し、更に押し込んだ状態にします。
   （5個）
4. 図に示すディスプレイの表示がすべて規格内にあることを確認します。
   規格：0000から0001(HEX.)

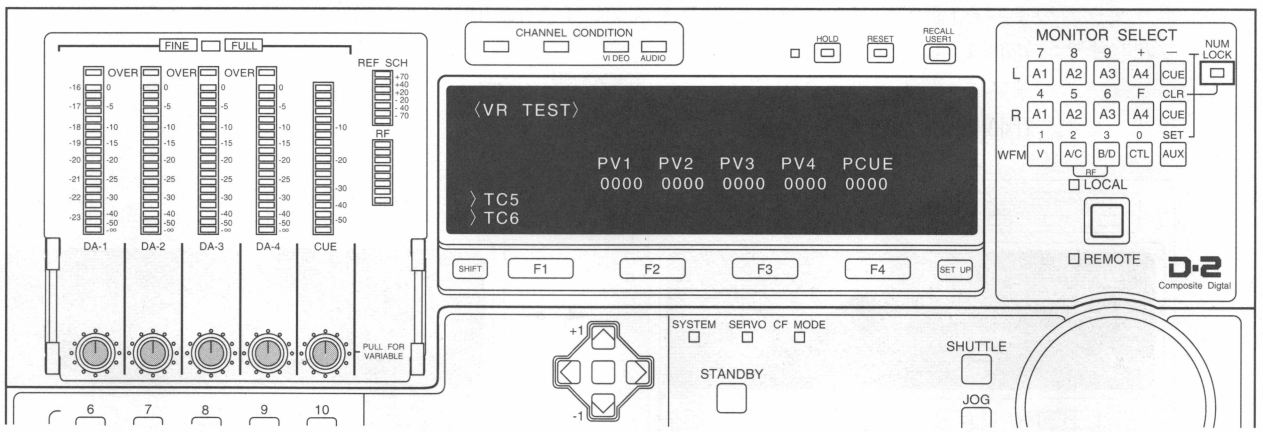


図3-4-21. VR Ass'y チェック (2)

5. ボリュームつまみを1個ずつ時計方向にゆっくり回します。このとき、対応するディスプレイ表示がスムーズに変化することを確認します。(図3-4-22)
   ディスプレイ変化：0000から03FF
6. 時計方向に回しきったとき、ディスプレイの表示が規格内にあることを確認します。
   規格：03FEまたは03FF(HEX.)
7. 反時計方向に回しきったとき、ディスプレイの表示が規格内にあることを確認します。
   規格：0000または0001 (HEX.)

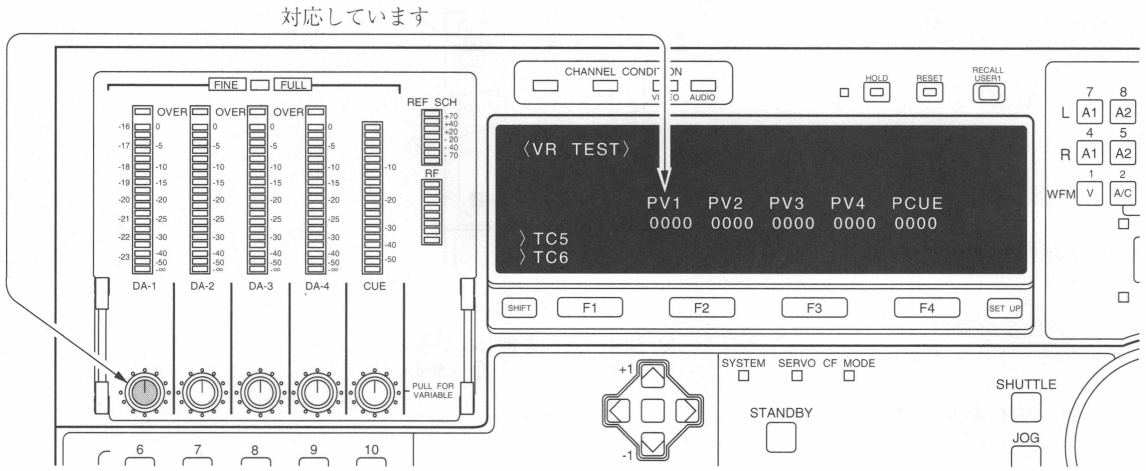
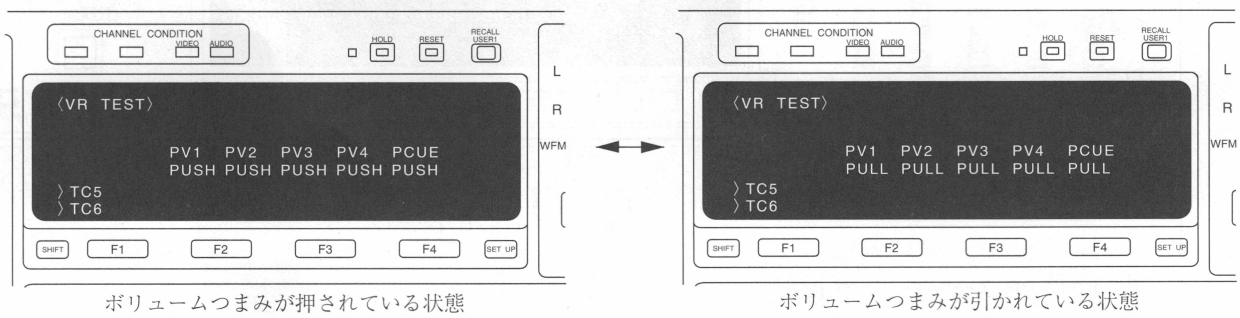


図3-4-22. VR Ass'y チェック (3)

8. STEPキーを押します。
9. 図3-4-23に示すディスプレイの表示がすべてPUSHになっていることを確認します。
10. ボリュームつまみを1個ずつ引き、対応するディスプレイ表示がPUSHからPULLに変わることを確認します。(図3-4-23)
11. ボリュームつまみを1個ずつ押し、対応するディスプレ表示がPULLからPUSH に変わることを確認します。(図3-4-23)



ボリュームつまみが押されている状態　　ボリュームつまみが引かれている状態

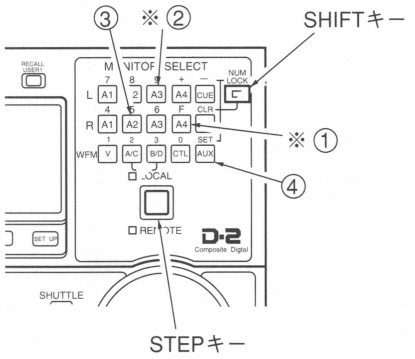
図3-4-23. VR Ass'y チェック (4)

12. STEPキーを押します。
    メニューを終了したい場合は、3-4-3章のステップ8を行い、初期メニュー画面に戻ることができます。

(8) ES-03 チェック

1. 3-4-3章のステップ1から7を行い、CONTROL PANEL TESTメニューを選択します。
   (7)から続けてチェックを行っているときは、ステップ2から行います。
2. 図3-4-24に示すモニターセレクトキーを下記の順に押します。

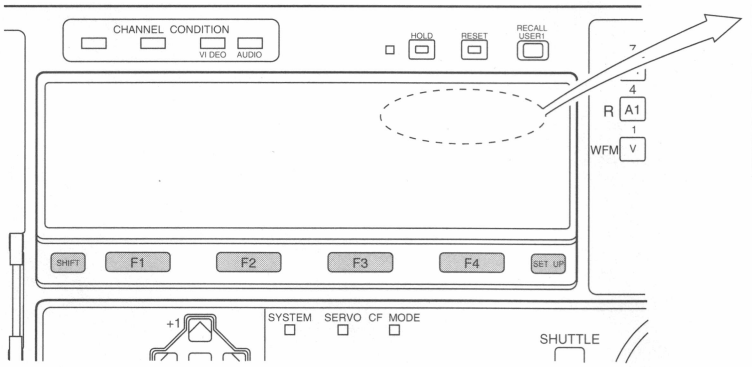
① SHIFTキー +R [A4] : T
② SHIFTキー +L [A3] : C
③ R [A2] : 7
④ WFM [AUX]



※ SHIFTキーを押しながら
これらのキーを押します。

図3-4-24. ES-03 チェック (1)

3. 図3-4-25に示す各スイッチを押したとき、対応する表示がディスプレイ上に表示されることを確認します。



押すスイッチ		表示
[SHIFT]	:	SHIFT KEY
[F1]	:	F1 KEY
[F2]	:	F2 KEY
[F3]	:	F3 KEY
[F4]	:	F4 KEY
[SET UP]	:	SET UP KEY

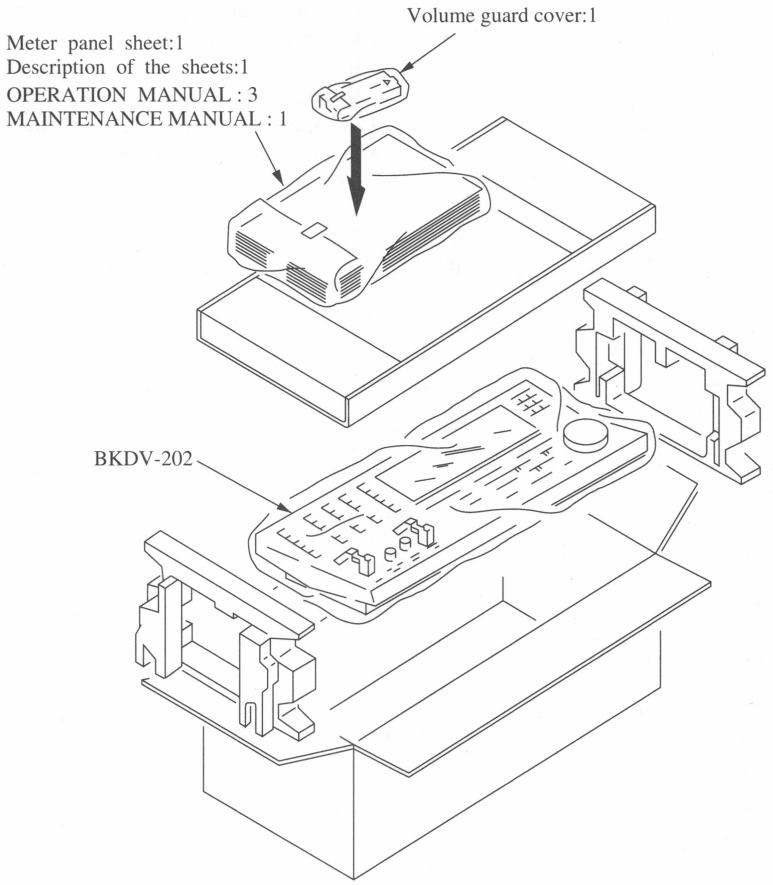
図3-4-25. ES-03 チェック (2)

4. STEPキーを押します。
   メニューを終了したい場合は、3-4-3章のステップ8を行い、初期メニュー画面に戻ることができます。

SECTION 1
INSTALLATION

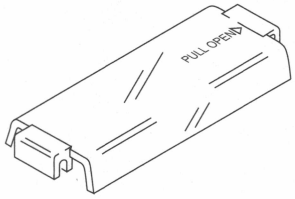
BKDV-202 is the control panel used for the D-2 format digital cassette player (DVR-P20, DVR-P28).
For the operation, refer to BKDV-202 Operation Manual.

1-1. UNPACKING AND REPACKING

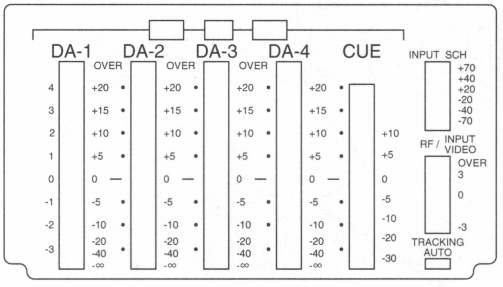


1-2. ACCESSORIES SUPPLIED

Volumel guard cover: 1
After the installation of the control panel, mount a cover to avoid inadvertently resetting the volume switches.



Meter panel sheet: 1
Attaching this sheet to the audio peak level meter changes the reference level from -20 dB to 0 dB.
For the attachment, refer to the supplied manual for the sheets.



MAINTENANCE MANUAL: 1
OPERATION MANUAL: 3
Description of the Sheets: 1

1-3. INSTALLATION CONDITIONS

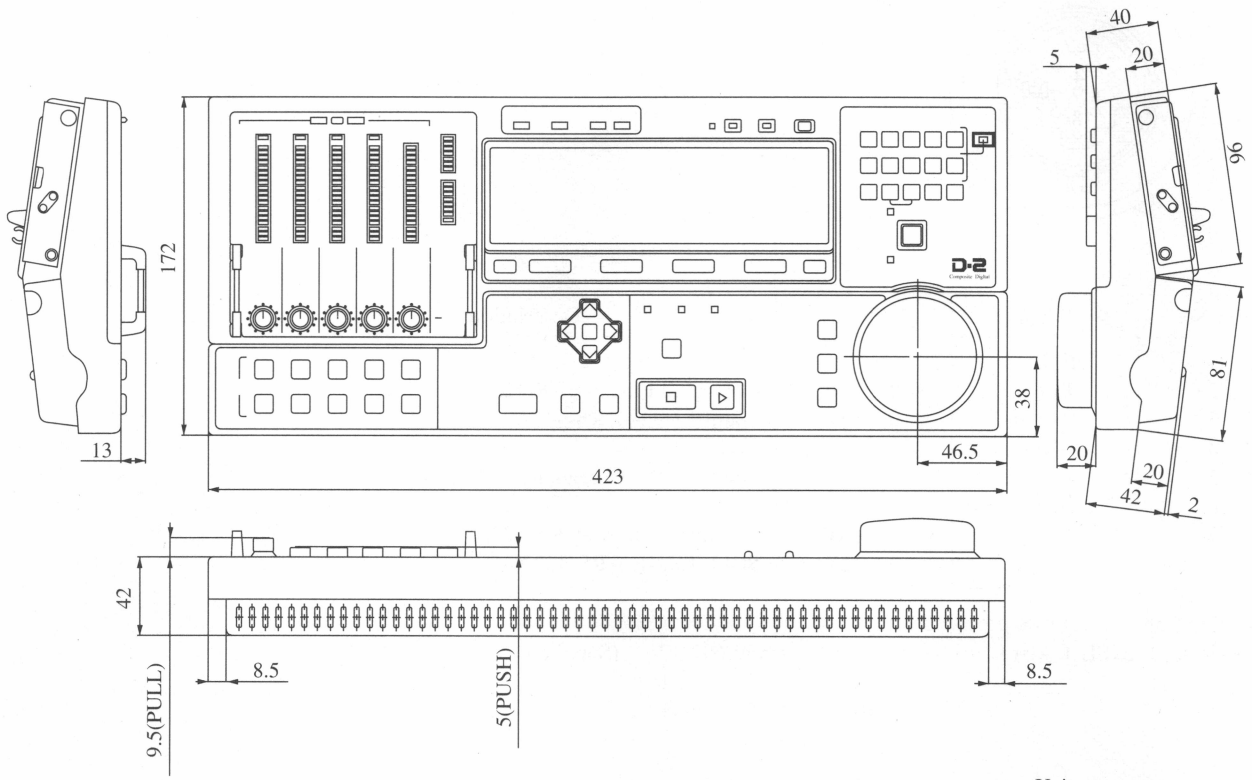
Operating Temperature; +5°C to +40°C
Storage Temperature; –20°C to +60°C
Humidity; 20% to 80% (noncondensing)

Do not install the unit in the following locations:

- Exposed to direct sunlight or powerful lighting
- In a dusty location
- In a location which is subjected to vibration
- In a powerful electric or magnetic field
- In a location which is subjected to electric noise
- In a location which is subjected to static electricity noise

1-4. EXTERNAL DIMENSIONS AND WEIGHT

(1) External Dimensions



Unit: mm

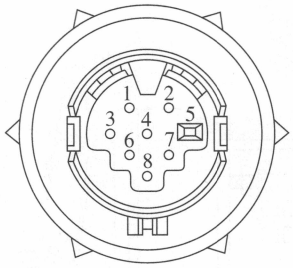
(2) Weight: 2.5 kg

1-5. INSTALLING ON THE PLAYER

For the installation of the control panel, refer to the PLAYER Maintenance Manual.

1-6. SIGNAL INPUTS AND OUTPUTS

– OUTSIDE VIEW –



MULTI 8 pin

Pin No.	Signal	Spec.	Description
1	F.G.		Frame Ground
2	Tx (–)	0 ~ +5V	Command Line (–), RS-422A
3	Rx (+)	0 ~ +5V	Status Line (+), RS-422A
4	GND		
5	+22V		Power + 22V Unregulated DC, 2A MAX
6	GND		
7	Tx (+)	0 ~ +5V	Command Line (+), RS-422A
8	Rx (–)	0 ~ +5V	Status Line (–), RS-422A

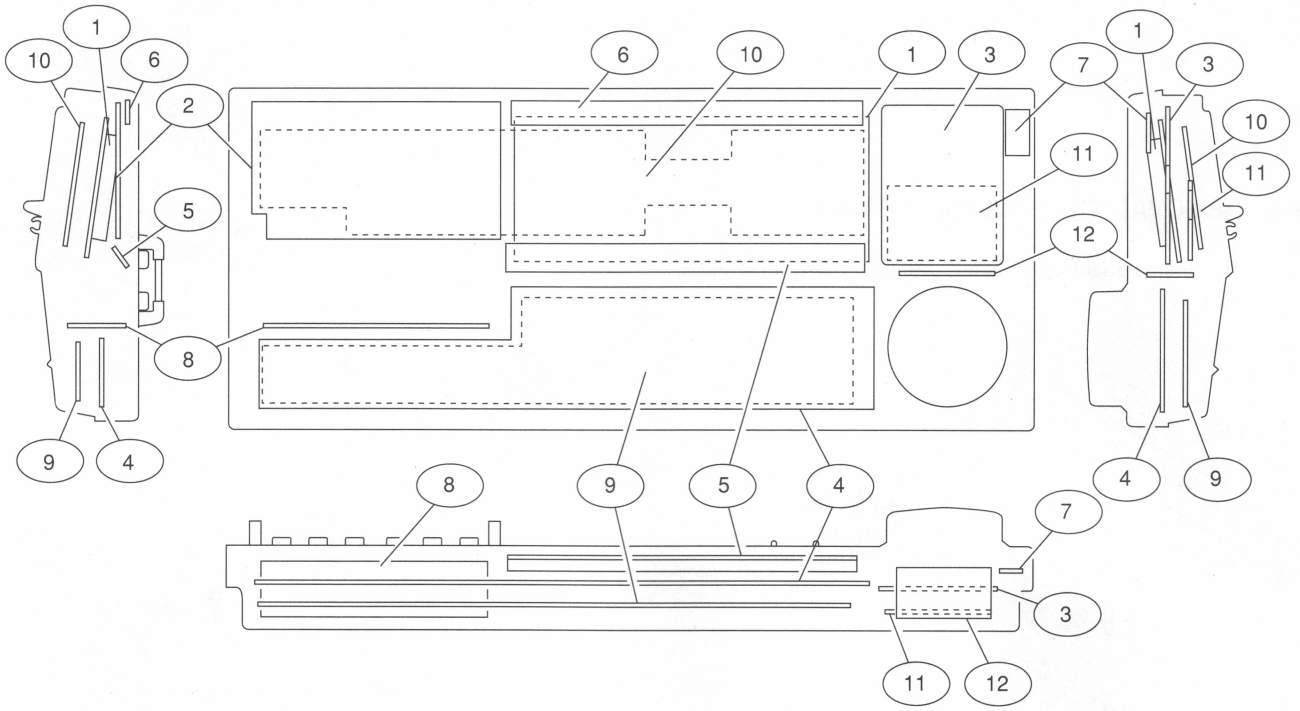
• Matching Cable

CONTROL PANEL CABLE	0.8 m	1-559-692-12	(Supplied Accessory of DVR)
	2 m	1-559-107-11	
	10 m	1-559-936-11	

SECTION 2
SERVICE INFORMATION

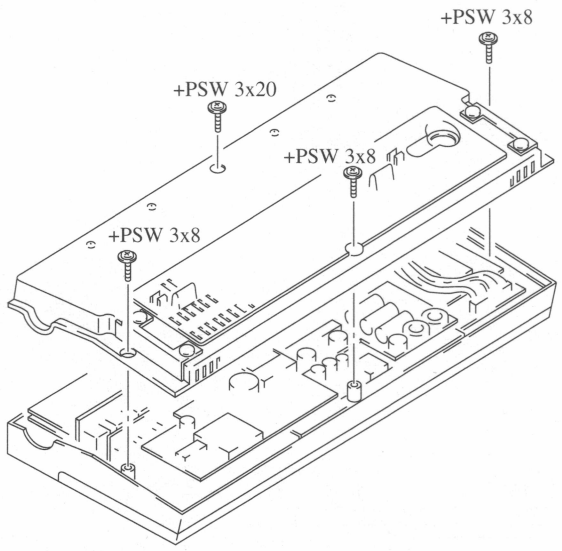
2-1. MAIN PARTS LOCATION

1 FL Panel (Fluorescence Luminescent)
2 LD-44 Board: Audio Level Meter
3 SW-461 Board: Monitor Select
4 SW-462 Board: Main Switch
5 ES-03 Board: Function Switch
6 LE-96 Board: Channel Condition
7 SW-465 Board: Mode Shift Switch
8 VR-121 Board: Audio Volume
9 CP-174 Board: CPU
10 CP-178 Board: CPU
11 CN-544 Board: 8 pin Connector
12 DET-11 Board: Switch Dial Detector



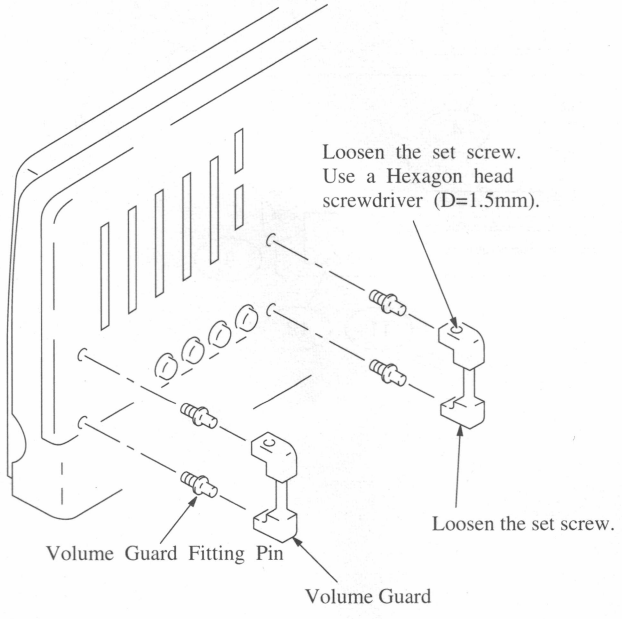
2-2. REMOVAL OF BOTTOM PANEL

Remove four screws (+PSW 3×8, +PSW 3×20) shown in the figure.



2-3. REMOVAL OF VOLUME GUARD

When the volume guard cover is not installed, the volume guard can be removed.



2-4. REPLACEMENT OF MAIN PARTS

2-4-1. Replacement of FL Panel

This unit is a block replacement part. If trouble occurs, ask for repair by specifying the content of the trouble clearly. Never disassemble the unit. There are high-voltage parts inside the unit.

(1) Remove the bottom panel. (See Section 2-2.)
(2) Remove the connectors, CN503 and 504, connected to CP-178 board shown in Fig. 1.
Then, remove the connectors, CN1 and 2, connected to the FL panel.
(3) Remove eight screws (+PSW 3×6) and remove CP-178 board. (Refer to Fig. 1.)
(4) Remove four screws (+PSW 3×8) and remove the FL panel. (Refer to Fig. 2.)
(5) Install a new FL panel in the reverse procedures of step (2) to (4), and then attach the bottom panel.

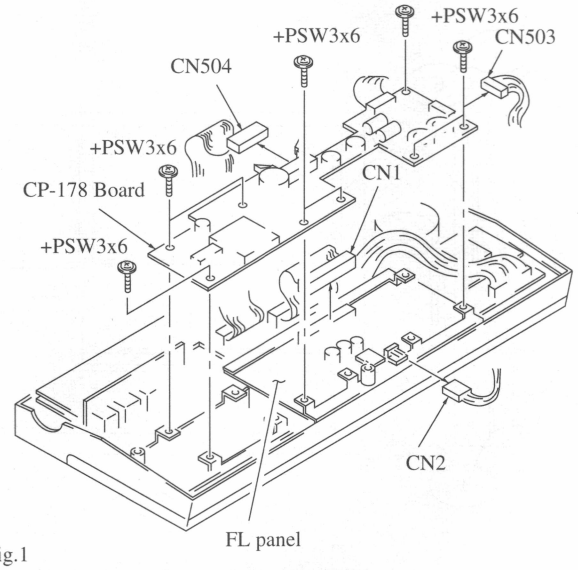


Fig.1

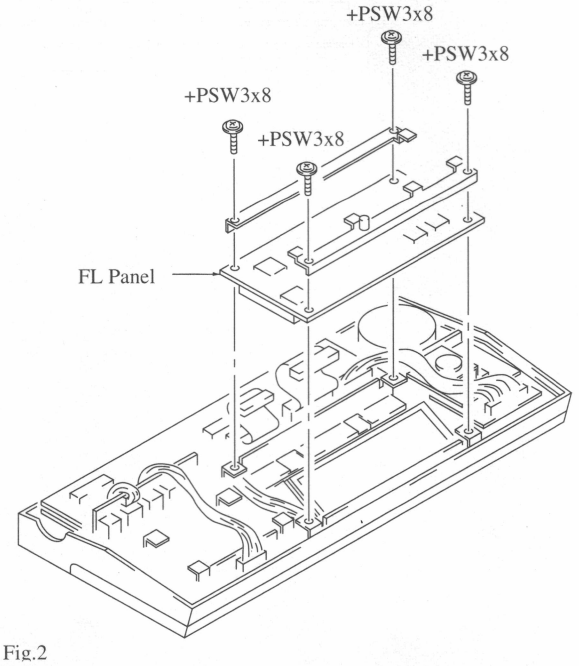


Fig.2

2-4-2. Replacement of Volume Switch Board (VR-121 Board)

(1) Remove five volume knobs from the front panel. (Refer to Fig. 1)
(2) Remove the bottom panel. (See Section 2-2.)
(3) Remove CP-178 board. (See Section 2-4-1.)

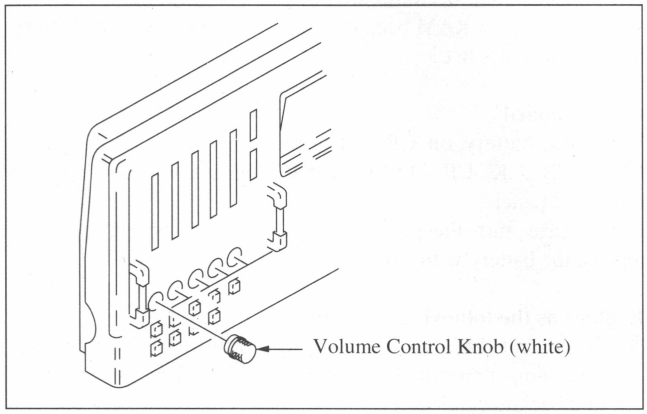


Fig.1

(4) Remove the connector CN516 connected to LD-44 board shown in Fig 2.
(5) Remove the two CN517 connectors connected to VR-121 boards.
(6) Remove two screws shown in Fig. 2 and remove the SW ass'y.

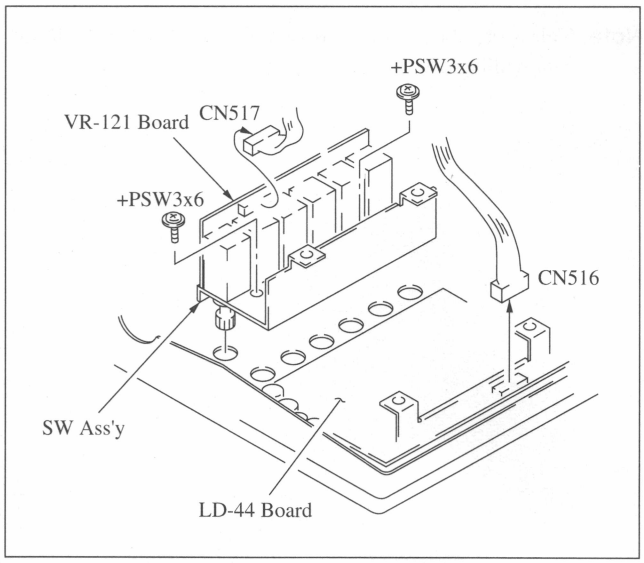


Fig.2

(7) Remove five nuts (including supplied washers) and remove VR-121 board. (Refer to Fig. 3)
(8) Replace the necessary parts (boards and volume switches).
(9) Install the SW ass'y in the reverse procedures of step (1) through (7).

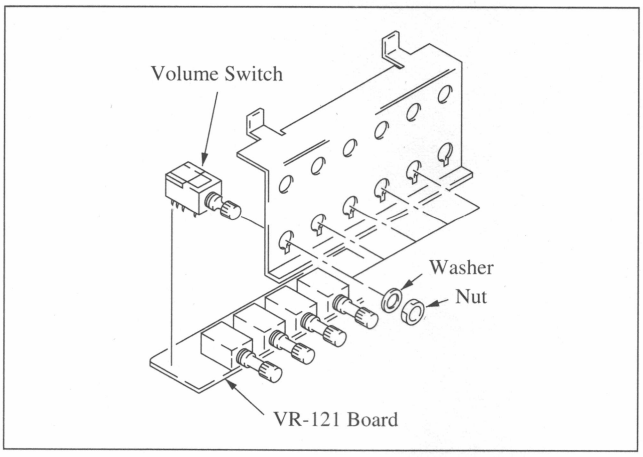


Fig.3

2-4-3. Replacing Backup Battery

The following board is provided with a RAM backup battery. The replacement procedures are described below:
When replacing a RAM back up battery, be sure to use the battery listed in the parts list.

CP-178 board
When the battery on CP-178 board runs down, "BATTERY EMPTY/BACK UP DATA LOST" message will be displayed on the FL panel.
In this case, turn the power OFF, remove the board, and then replace the battery with a new one.

Replace as the following procedures
(1) To prevent RAM data from being lost in replacing a battery, set a jumper switch JP1 from BB to CC (JP1 is set to the side of a backup condenser).
(2) Replace quickly a battery with a new one.
(3) Reset JP1 from CC to BB.

Note: Unless the above procedures are followed, all of the RAM data will be lost.

2-5. NOTES ON REPAIR PARTS

2-5-1. Notes on Repair Parts

(1) Safety Related Components Warning

Components marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation.
Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts

Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to accommodating improved parts and/or engineering changes or standardization of genuine parts.
This manual's exploded views and electrical spare parts list indicate the part numbers of current standardized genuine parts.

(3) Change of Parts

Regarding engineering parts changes, refer to Section 8. CHANGED PARTS.

(4) Stock of Parts

Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional time for delivery.

(5) Units for Capacitors, Inductors and Resistors

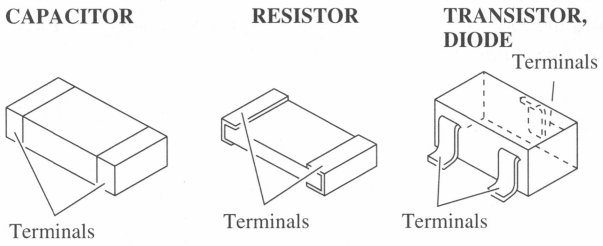
The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors: μF
Inductors: μH
Resistors: ohm

2-5-2. Replacement Procedure of Chip Parts

Required Tools
- Soldering iron; 20W
  - If possible, use a soldering-iron tip heat-controller set to 270 ±10°C.
- Braided wire;
  - SOLDER TAUL or equivalent
  - Sony part No. 7-641-300-81
- Solder; 0.6 mm dia. is recommended.
- Tweezers

Soldering Conditions
- Soldering iron temperature;
  - 270 ± 10°C
- Soldering time;
  - 2 seconds per pin



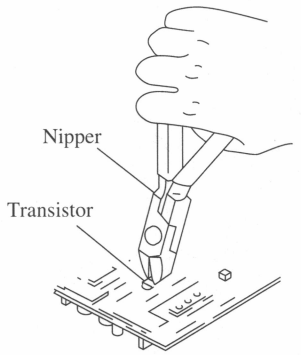
Replacement of Resistor and Capacitor

1. Place the soldering-iron tip onto the chip part and heat it up until the solder is melted. When the solder is melted, slide the chip part aside.
2. Make sure that there is no pattern peeling, damage and/or bridge around the desoldering positions.
3. After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
4. Place new chip part in the desired position and solder both ends.

Note: Do not use a chip part again once it has been removed.

Replacement of Transistors and Diodes

1. Cut the terminals of the chip part with nippers.
2. Remove the cut leads as above.
3. Make sure that there is no pattern peeling, damage and/of bridge around the desoldering positions.
4. After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
5. Place new chip part in the desired position and solder the terminals.



Replacement of ICs

1. Using the braided wire, "SOLDER TAUL" Sony Part No. 7-641-300-81, remove the solder around the pins of the IC-chip to be removed.
2. While heating up the pins, remove the pins one by one using sharp-pointed tweezers.
3. Make sure that there is no pattern peeling, damage and/or bridge around the desoldering positions.
4. After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
5. Place new chip part in the desired position and solder the pins.

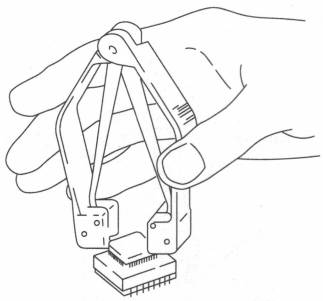
2-5-3. How to Replace the PLCC-type ICs

Use the following tool for replacement.

Extraction Tool (for PLCC socket)

Sony Part No. J-6035-070-A

This Extraction Tool is useful for extracting an integrated circuit of PLCC type and fits all sizes of ICs from 20 pins through 124 pins.



Note: DO NOT try to pull chip carrier out of socket and let the tool action pull it out.
DO NOT squeeze harder than necessary, only enough that the tool action occurs.

[How to use the Extraction Tool]

• Step 1

Adjust width so that claws of tool will fit into the slots of the chip carrier socket. (Fig. 1)

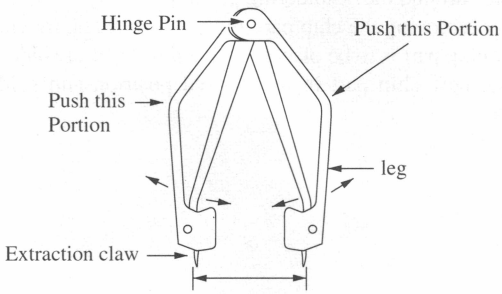
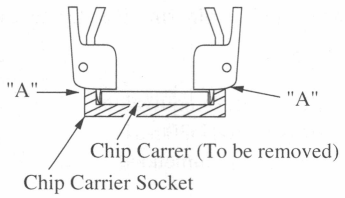


Fig. 1

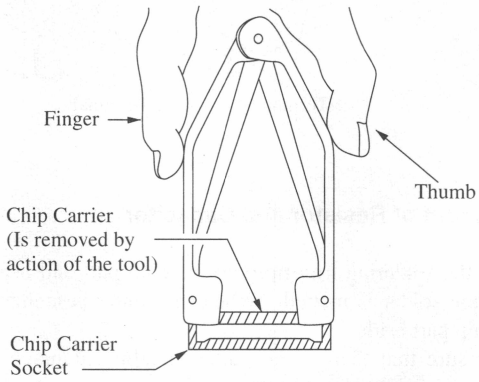
• Step 2

Insert the claws into the slots of the carrier socket. Push fully in so that the tool butts on the socket at "A".



• Step 3

Place the thumb and the 1st or 2nd finger on the ribbed area of the tool. Maintain a small downward force to keep the tool butted on the socket. Squeeze the thumb and finger together so that the tool legs tend to straighten. This action will draw the chip carrier out of the socket and grip it within the tool legs. Maintain the squeezing action so as to hold the chip in the tool, hold the tool over your other hand and relax the squeeze, the chip will fall out of the tool and into your hand.

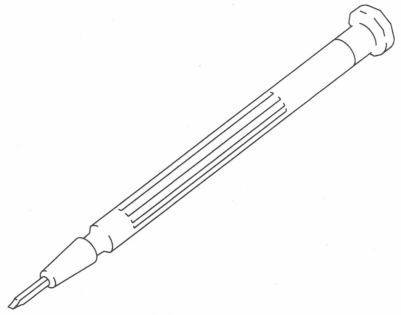


2-6. TOOLS AND FIXTURES

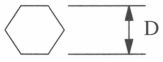
1. Oscilloscope
   2445 or 2465 (Sony Tektronix) or equivalent
   Frequency band: 150 MHz or more

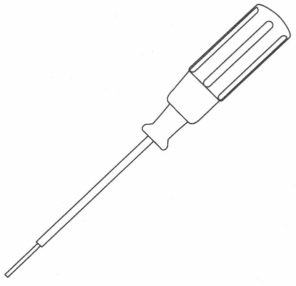
2. Digital voltmeter
   3435A (Hewlett-Packard) or equivalent
   Number of significant digits: 5 digits or more
   Accuracy: 0.02%, ±1 count or less

3. Adjusting screwdriver: 1.3 mm (ceramic)
   Sony Part Number: 7-721-052-81
   This screwdriver is used for adjusting the volume control on the board.

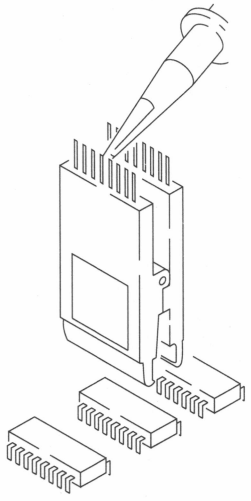


4. Hexagon head screwdriver
   Sony Part Numbers: D = 1.5 mm 7-700-735-00 or
   J-6041-700-C
   (L-WRENCH DRIVER)

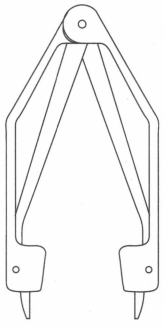




5. IC Test Clip
   Sony Part Numbers: TC-16 J-6041-770-A
   TC-20 J-6041-780-A
   When checking or adjusting, these clips are convenient for hooking the probe of an oscilloscope onto the DIP-type IC legs. The TC-16 is used for the 14-pin or 16-pin DIP ICs and the TC-20 for the 18-pin or 20-pin DIP ICs.



6. PLCC IC Extraction Tool
   Sony Part Number: J-6035-070-A
   This tool is convenient for use in extracting PLCC-type ICs that are inserted in the IC socket.
   This tool can be used for most ICs having 20 pins to 124 pins.



SECTION 3
ALIGNMENT

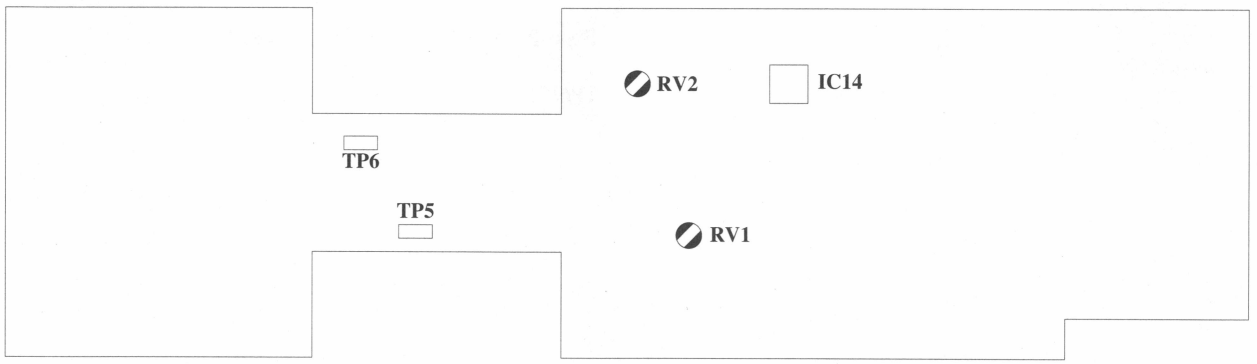
Measuring Instruments

Digital voltmeter
3435A (Hewlett-Packard)

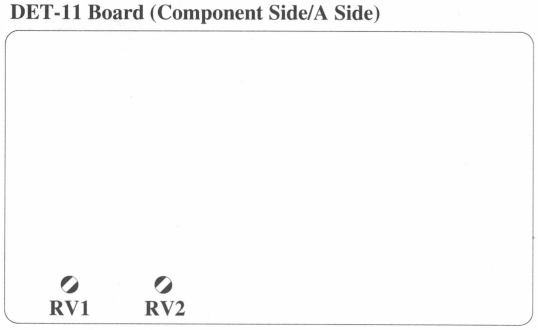
Oscilloscope
2445 or 2465 (Sony Tektronix)

Alignment Component Location

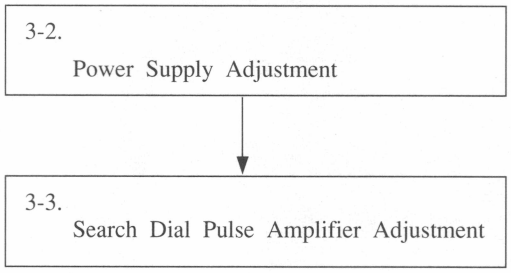
CP-178 Board (Component Side/A Side)



DET-11 Board (Component Side/A Side)



3-1. ADJUSTMENT SEQUENCE



3-2. POWER SUPPLY ADJUSTMENT

Equipment; Digital voltmeter

After replacing the following controls, set them to the positions indicated below before readjusting them.

RV1; Counterclockwise fully
RV2; Counterclockwise fully

Step 1. +5 V voltage adjustment

TP5/CP-178 = +5.20 ±0.05 Vdc
⊘ RV1/CP-178

Step 2. +12V voltage adjustment

TP6/CP-178 = +12.00 ±0.05 Vdc
⊘ RV2/CP-178

3-3. SEARCH DIAL PULSE AMPLIFIER ADJUSTMENT

Equipment; Oscilloscope

Step 1. Adjustment

Enter the JOG mode, then while rotating the search dial turn ⊘ RV1 on DET-11 board left and right. Set ⊘RV1 to the point mid-way between the point at which a pulse appears at pin 14 of IC14 on CP-178 board when ⊘ RV1 is turned to the left, and the point at which the pulse appears when ⊘ RV1 is turned to the right.

Step 2.

Enter the JOG mode, then like Step 1, adjust ⊘RV2 on DET-11 board with respect to the output from pin 13 of IC14 on CP-178 board.

Step 3.

Rotate the search dial in the FWD direction. Check the phases of pins 14 and 13 of IC14.

14Pin/IC14/CP-178

13Pin/IC14/CP-178

Step 4.

Rotate the search dial in the REV direction. Check the phases of pins 14 and 13 of IC14.

14Pin/IC14/CP-178

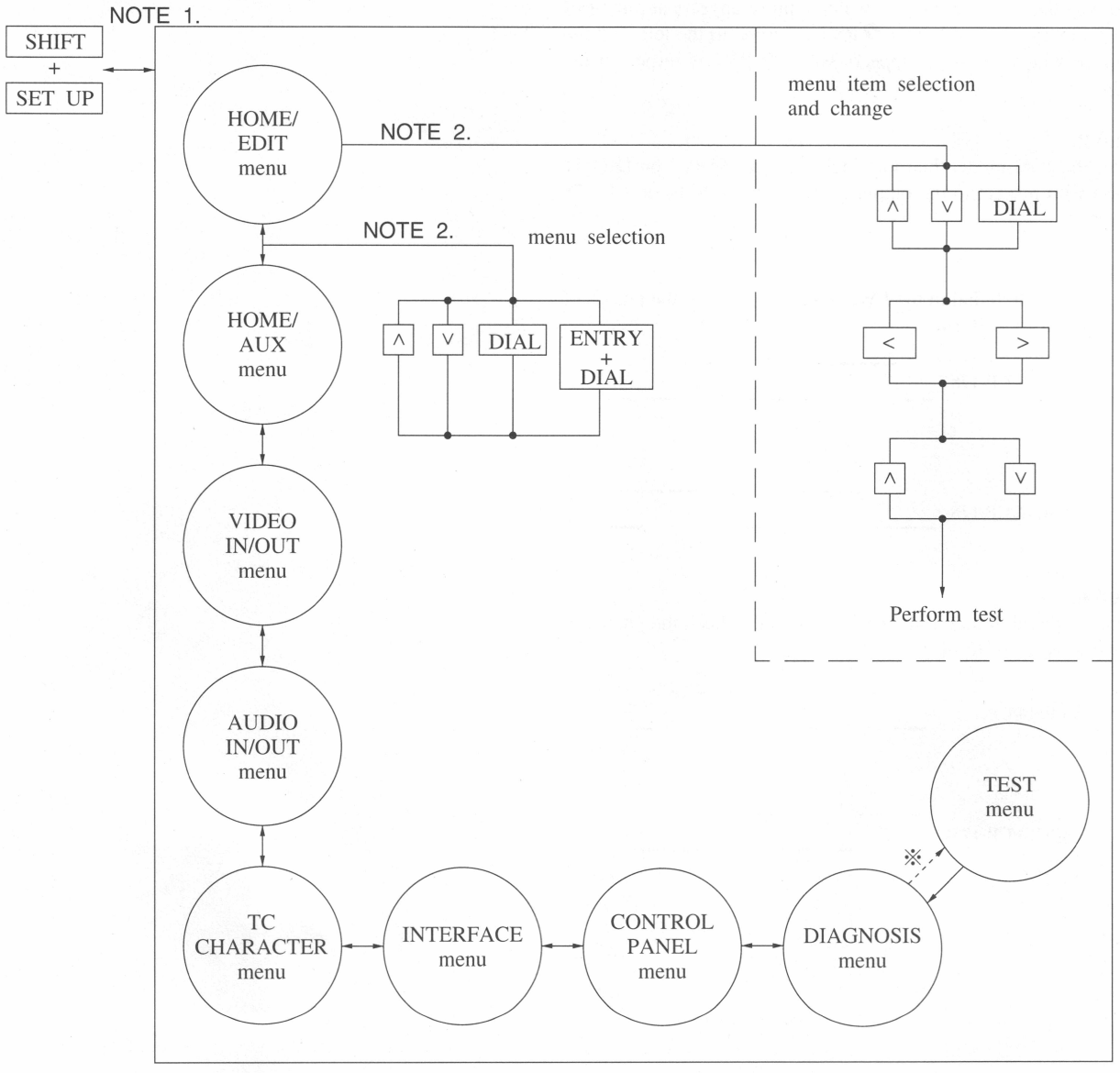
13Pin/IC14/CP-178

3-4. TEST MODE

Basic Knowledge

The TEST mode is an important item when maintaining, checking and repairing the unit.

TEST mode flowchart

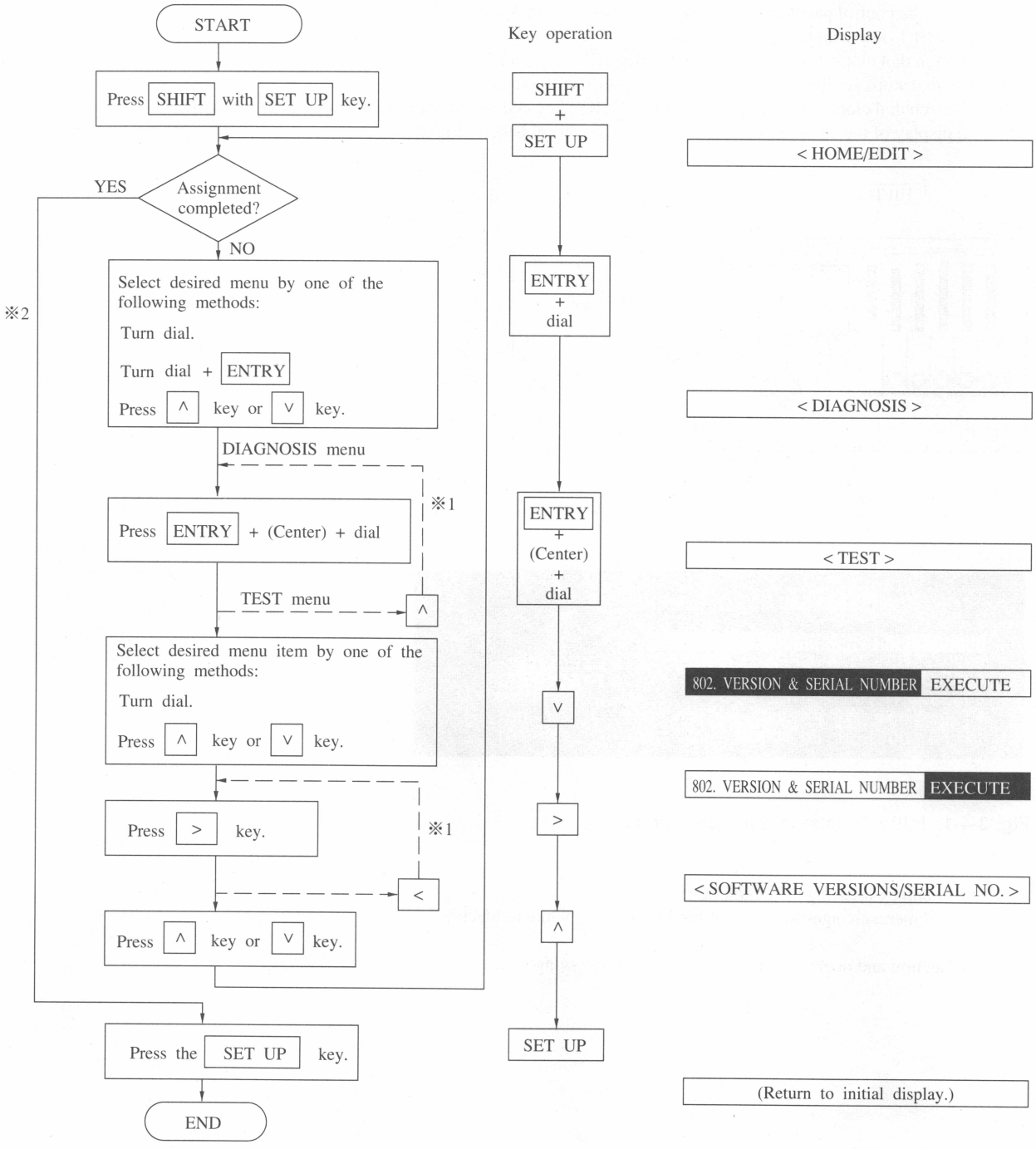


NOTE1: Press a [SET UP] key to terminate a set up mode. To return to the menu before pressing the [SET UP] key, press a [SHIFT] key with the [SET UP] key.

NOTE2: Carry out the same procedures for another menu (included the TEST menu).

* This menu mode cannot enter from a DIAGNOSIS menu to the TEST menu by the [∧], [∨] key or the dial. (The dial stops scrolling at the end of the DIAGNOSIS menu.) To enter the TEST menu, turn the dial to the end of the DIAGNOSIS menu. And press the [ENTRY] key and a cursor (Center) key simultaneously while turning the dial clockwise or pressing the cursor [∨] key.

Operation flow of TEST menu or example of operation



*1: The broken lines indicate how to retrace one step.

*2: To terminate the menu after selecting the CONTROL PANEL TEST menu, carry out the step 8 of Section 3-4-3.

3-4-1. The way into the Menu

Press the keys on the control panel in the following sequence. (Fig.3-4-1)

1. Press the [SHIFT] key with the [SET UP] key. (Fig.1)
2. Turn a search dial clockwise with pressing the [ENTRY] key.(Fig.1)
   The search dial stops scrolling at the end of the DIAGNOSIS menu.
3. Turn the search dial clockwise with pressing the [ENTRY] key and the cursor (Center) key simultaneously.
   An initial display of the TEST mode is appeared on the control panel. (Fig.2)

Fig. 1

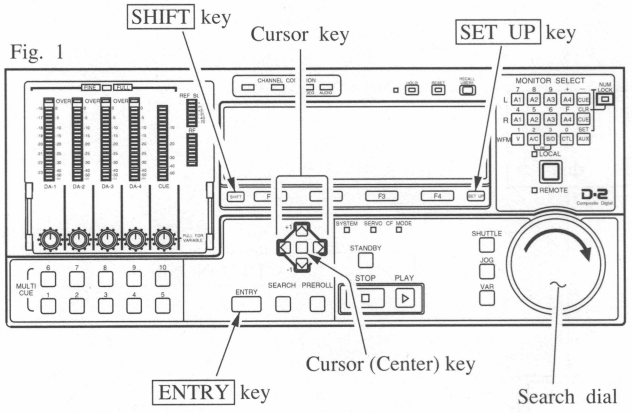


Fig. 2

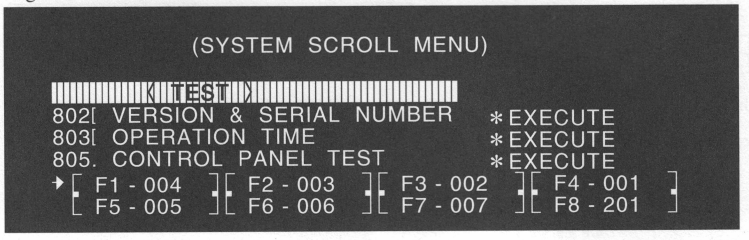


Fig. 3-4-1 Initial Display of the TEST mode

4. Select the menu by pressing the cursor key.
   (The selected menu changes the color of the figures from white to black.)

Each menu's function and operation are described in the following sections.

3-4-2. VERSION & SERIAL NUMBER Menu

This menu shows the ROM version, serial number and area of the VTR.

The way into and out of the menu

Press the keys on the control panel in the following sequence. (Fig.3-4-2)

1. SHIFT + SET UP
2. ENTRY + search dial
   The dial stops scrolling at the end of the DIAGNOSIS menu.
3. ENTRY + Center + search dial
   The TEST menu is selected. (Refer to Section 3-4-1.)
4. Turn the search dial clockwise or press the cursor ∨ key.
   The VERSION & SERIAL NUMBER menu is selected. (Fig.1)
5. cursor > key: The color of an EXECUTE part changes from white to black. (Fig.2)
6. cursor ∧ key: The display is appeared as shown in Fig.3.
   The ROM versions of each board, serial number and area are displayed.
7. SET UP : The VERSION & SERIAL NUMBER menu is terminated, and the display returns to the initial display. To select other TEST menu continuously, press the SHIFT key and SET UP key simultaneously again. The menu display returns to the TEST mode.

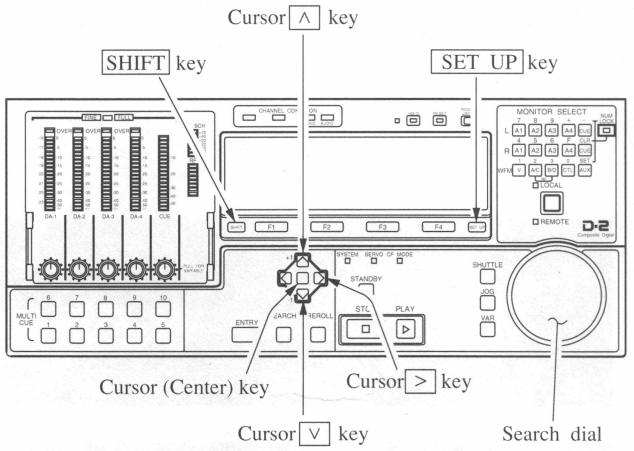


Fig. 1

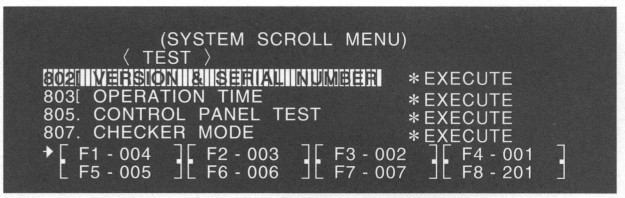
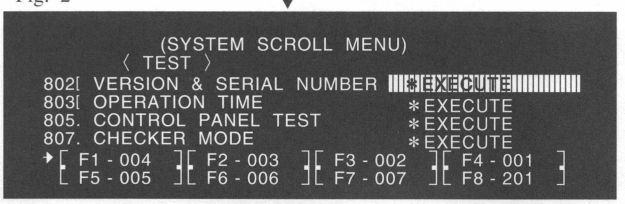

(SYSTEM SCROLL MENU)
〈 TEST 〉
802[VERSION & SERIAL NUMBER *EXECUTE
803[OPERATION TIME *EXECUTE
805. CONTROL PANIL TEST *EXECUTE
807. CHECKER MODE *EXECUTE
[F1 - 004][F2 - 003][F3 - 002][F4 - 001]
[F5 - 005][F6 - 006][F7 - 007][F8 - 201]

Fig. 2


(SYSTEM SCROLL MENU)
〈 TEST 〉
802[VERSION & SERIAL NUMBER *EXECUTE
803[OPERATION TIME *EXECUTE
805. CONTROL PANEL TEST *EXECUTE
807. CHECKER MODE *EXECUTE
[F1 - 004][F2 - 003][F3 - 002][F4 - 001]
[F5 - 005][F6 - 006][F7 - 007][F8 - 201]

NOTE: In the version display menu, "CP" shows the ROM version of the control panel.

CP xx (ROM version of CP-178 Board)
xx (ROM version of CP-174 Board)

Fig. 3

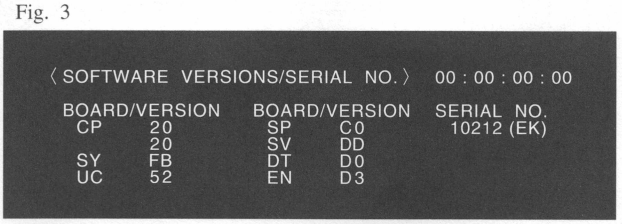

〈 SOFTWARE VERSIONS/SERIAL NO. 〉 00 : 00 : 00 : 00
BOARD/VERSION BOARD/VERSION SERIAL NO.
CP 20 SP C0 10212 (EK)
20 SV DD
SY FB DT D0
UC 52 EN D3

Fig. 3-4-2 VERSION & SERIAL NUMBER Menu

3-4-3. CONTROL PANEL TEST Menu

• This menu is used to check whether the control panel operates normally.

NOTE: Refer to the following example in pressing the monitor select keys.
Example: L [A1] : 1
"L" means the rank on the sheet.
" [A1] " means the monitor select key.
": 1" means the figure output in the display.

The way into and out of the menu

Press the keys on the control panel in the following sequence.

1. [SHIFT] + [SET UP]
2. [ENTRY] + search dial
   The dial stops scrolling at the end of the DIAGNOSIS menu.
3. ENTRY + Center + search dial
   The mode enters the TEST menu.(Refer to Section 3-4-1.)
4. Turn the search dial clockwise or press the cursor [∨] key.
   Select the CONTROL PANEL TEST menu. (Fig.1)
5. cursor [>] key: The color of an EXECUTE part changes from white to black. (Fig.2)
6. cursor [∧] key: The display is appeared as shown in Fig.3.
7. WFM [AUX]: The "?" mark is appeared in the display next to a prompt, and another prompt is output under the "?" mark.

Fig. 3-4-3 CONTROL PANEL TEST Menu

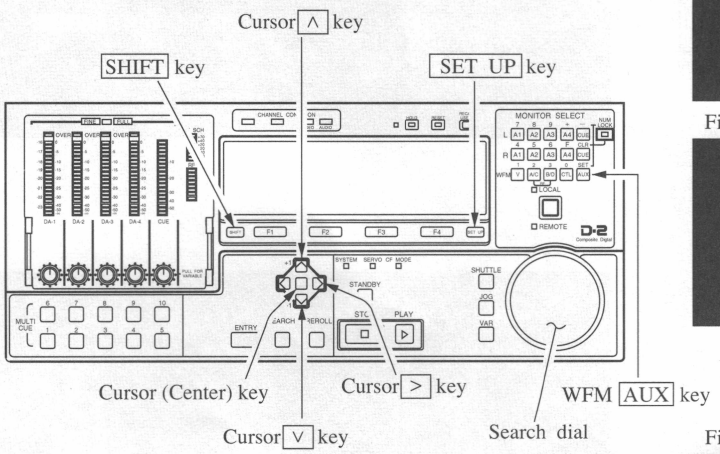


Fig. 1

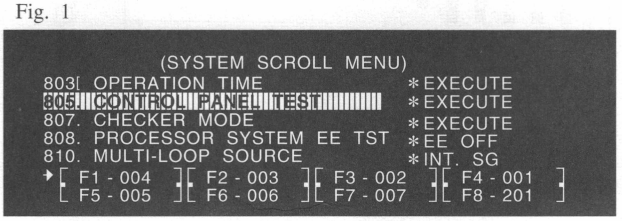

(SYSTEM SCROLL MENU)
803[OPERATION TIME *EXECUTE
805. CONTROL PANEL TEST *EXECUTE
807. CHECKER MODE *EXECUTE
808. PROCESSOR SYSTEM EE TST *EE OFF
810. MULTI-LOOP SOURCE *INT. SG
[F1 - 004][F2 - 003][F3 - 002][F4 - 001]
[F5 - 005][F6 - 006][F7 - 007][F8 - 201]

Fig. 2

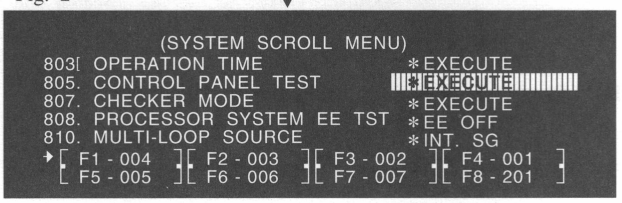
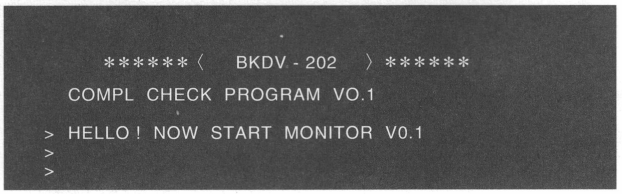

(SYSTEM SCROLL MENU)
803[OPERATION TIME *EXECUTE
805. CONTROL PANEL TEST *EXECUTE
807. CHECKER MODE *EXECUTE
808. PROCESSOR SYSTEM EE TST *EE OFF
810. MULTI-LOOP SOURCE *INT. SG
[F1 - 004][F2 - 003][F3 - 002][F4 - 001]
[F5 - 005][F6 - 006][F7 - 007][F8 - 201]

Fig. 3



8. To terminate or cancel the menu, return to the initial menu display in the following sequence. Carry out [1] or [2].

   Press the monitor select keys (shown in Fig.3-4-4) in the following sequence.

   [1]

   ❶ WFM [CTL] + WFM [AUX]
   Press the WFM [CTL] key, and then press the WFM [AUX] key simultaneously.
   If the WFM [AUX] key is pressed first, the menu doesn't terminate.

   [2]

   ① SHIFT key + R [A4] : T is input.
   ② SHIFT key + L [A3] : C is input.
   ③ SHIFT key + L [A4] : D is input.
   ④ L [A4] : 4 is input.
   ⑤ WFM [AUX] : The display returns to the initial menu display.

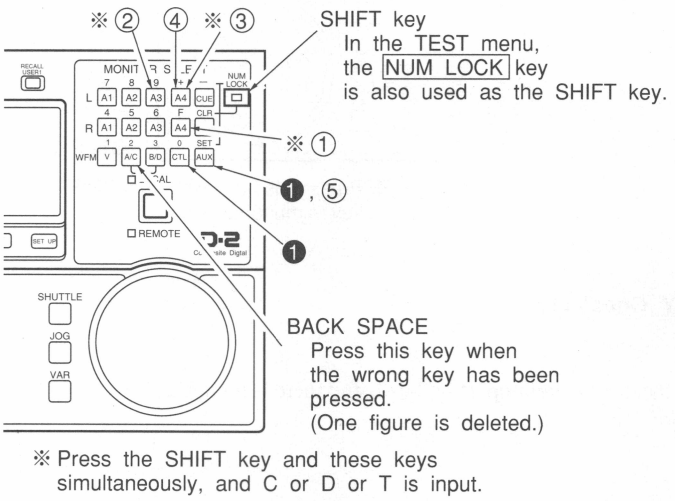

※ ② ④ ※ ③
SHIFT key
In the TEST menu, the NUM LOCK key is also used as the SHIFT key.
※ ①
❶, ⑤
❶
BACK SPACE
Press this key when the wrong key has been pressed.
(One figure is deleted.)
※ Press the SHIFT key and these keys simultaneously, and C or D or T is input.

Fig. 3-4-4 The way out of the TEST Menu

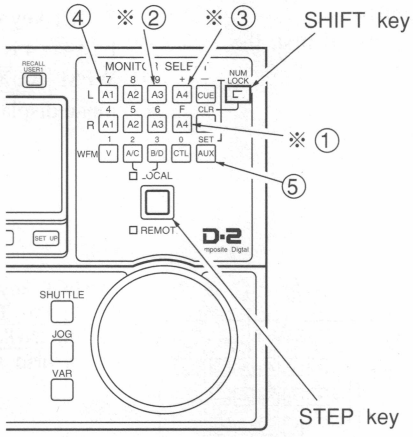
Check each board installed in the control panel. For details, refer to the following items.

(1) DISPLAY check
(2) SW-462 check
(3) SW-461 check
(4) LE-96 check
(5) SW-465 check
(6) LD-44 check
(7) VR Ass'y check
(8) ES-03 check

(1) DISPLAY check

1. Enter the CONTROL PANEL TEST menu by steps 1 through 7 of Section 3-4-3.
2. Press the monitor select keys shown in Fig.3-4-5 in the following sequence.

   ① SHIFT key + R [A4] : T
   ② SHIFT key + L [A3] : C
   ③ SHIFT key + L [A4] : D
   ④ L [A1] : 1
   ⑤ WFM [AUX]



※ Press this key with the SHIFT key simultaneously.

Fig.3-4-5 DISPLAY Check (1)

3. Check that all dots on the display light up (Fig.3-4-6) and there is no noise.
   (Dots of the left side don't light up.)

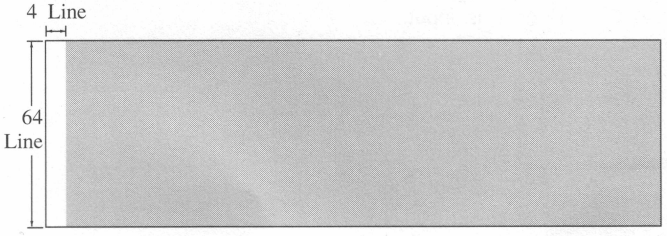


Fig.3-4-6 DISPLAY Check (2)

4. After checking, press the STEP key of the monitor select keys.
   To terminate or cancel the menu, return to the initial menu display by step 8 of Section 3-4-3.

(2) SW-462 check

1. Enter the CONTROL PANEL TEST menu by steps 1 through 7 of Section 3-4-3.
   When the check is carried out from step (1) continuously, carry out the check from step 2.
2. Press the monitor select keys shown in Fig.3-4-7 in the following sequence.

   ① SHIFT key + R [A4] : T
   ② SHIFT key + L [A3] : C
   ③ L [A1] : 1
   ④ WFM [AUX]

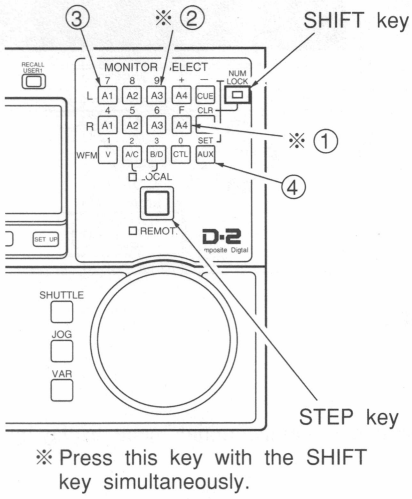


Fig. 3-4-7 SW-462 Check (1)

3. Check that the keys and LED shown in Fig.3-4-8 light up. (22 pieces)
4. Press the STEP key.
5. Check that the keys and LED shown in Fig.3-4-8 flash. (22 pieces)
6. Press the STEP key.
7. Press each key shown in Fig.3-4-8, and check that the corresponding LED lights up (except for five cursor keys).

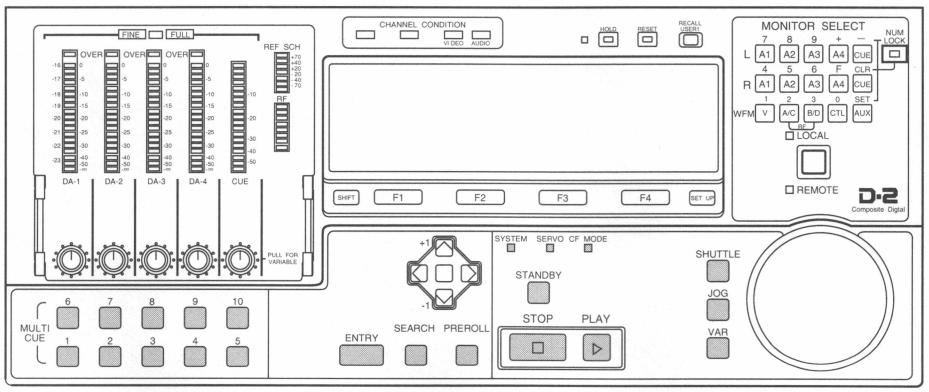


Fig. 3-4-8 SW-462 Check (2)

8. Press the cursor keys shown in Fig.3-4-9, and check that the corresponding display is appeared and/or corresponding LED lights up.

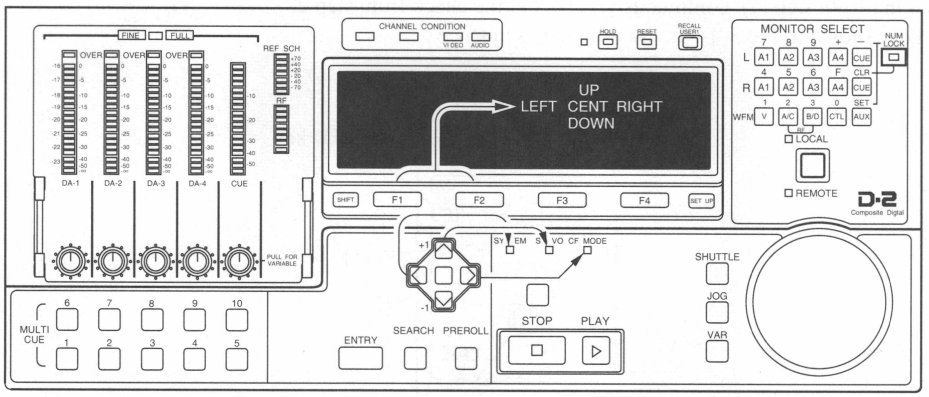


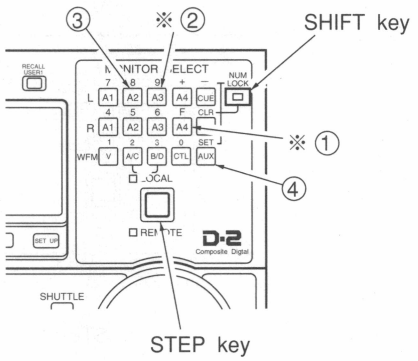
Fig.3-4-9 SW-462 Check (3)

9. Press the STEP key.
To terminate or cancel the menu, return to the initial menu display by step 8 of Section 3-4-3.

(3) SW-461 check

1. Enter the CONTROL PANEL TEST menu by steps 1 through 7 of Section 3-4-3.
   When the check is carried out from step (2) continuously, carry out the check from step 2.
2. Press the monitor select keys shown in Fig.3-4-10 in the following sequence.

   ① SHIFT key + R [A4] : T
   ② SHIFT key + L [A3] : C
   ③ L [A2] : 2
   ④ WFM [AUX]



※ Press this key with the SHIFT key simultaneously.

Fig.3-4-10 SW-461 Check (1)

3. Check that the keys and LED shown in Fig.3-4-11 light up.
4. Press the STEP key.
5. Check that the keys and LED shown in Fig.3-4-11 flash.
6. Press the STEP key.
7. Press the keys shown in Fig.3-4-11 one by one, and check that the corresponding LED lights up.

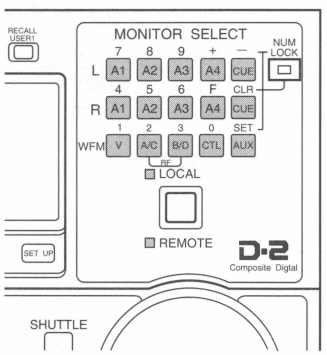


Fig.3-4-11 SW-461 Check (2)

8. Press the STEP key.
   To terminate or cancel the menu, return to the initial menu display by step 8 of Section 3-4-3.

(4) LE-96 check

1. Enter the CONTROL PANEL TEST menu by steps 1 through 7 of Section 3-4-3.
   When the check is carried out from step (3) continuously, carry out the check from step 2.
2. Press the monitor select keys shown in Fig.3-4-12 in the following sequence.

   ① SHIFT key + R [A4] : T
   ② SHIFT key + L [A3] : C
   ③ L [A3] : 3
   ④ WFM [AUX]

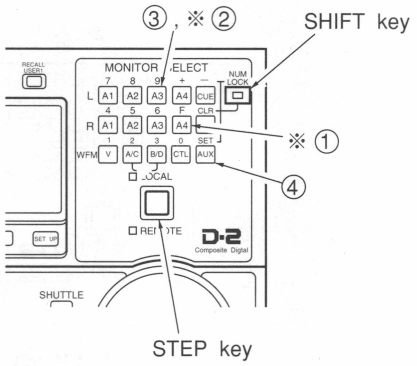


Fig.3-4-12 LE-96 Check (1)

3. Check that each LED shown in Fig.3-4-13 lights up one by one in turn.

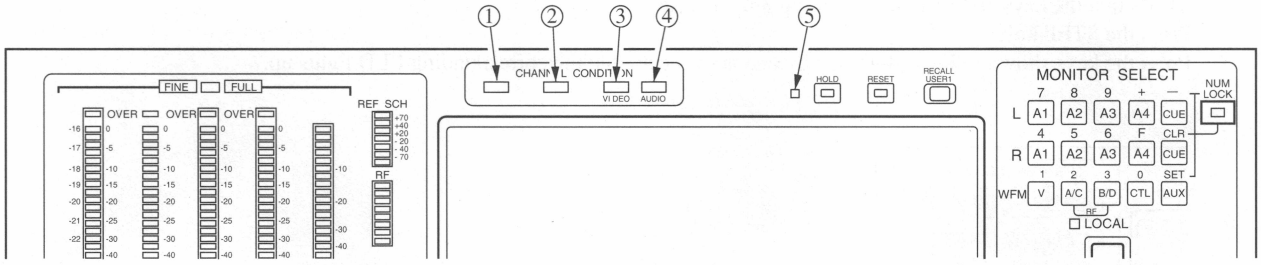


Fig.3-4-13 LE-96 Check (2)

4. Press the STEP key.
5. Press each key shown in Fig.3-4-14, check that the corresponding LED lights up.

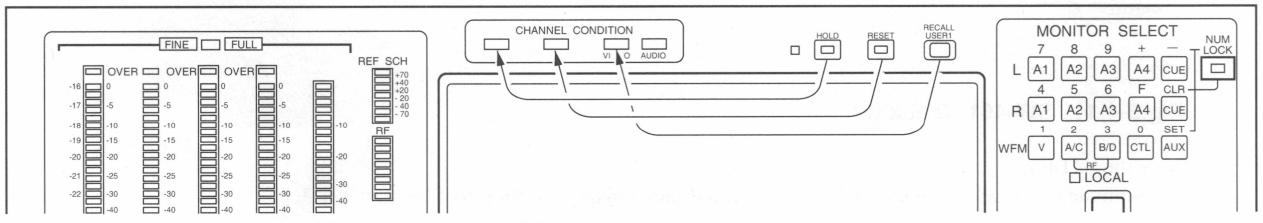


Fig.3-4-14 LE-96 Check (3)

6. Press the STEP key.
   To terminate or cancel the menu, return to the initial menu display by step 8 of Section 3-4-3.

(5) SW-465 check

1. Enter the CONTROL PANEL TEST menu by steps 1 through 7 of Section 3-4-3.
   When the check is carried out from step (4) continuously, carry out the check from step 2.
2. Press the monitor select keys shown in Fig.3-4-15 in the following sequence.

   ① SHIFT key + R [A4] : T
   ② SHIFT key + L [A3] : C
   ③ L [A4] : 4
   ④ WFM [AUX]

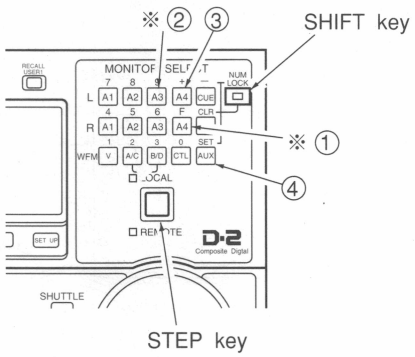


Fig.3-4-15 SW-465 Check (1)

3. Press the [NUM LOCK] key shown in fig.3-4-16, and check that LED of the [NUM LOCK] key lights up.

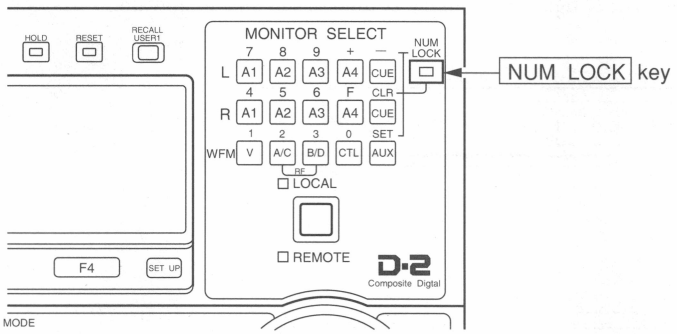


Fig.3-4-16 SW-465 Check (2)

4. Press the STEP key.
   To terminate or cancel the menu, return to the initial menu display by step 8 of Section 3-4-3.

(6) LD-44 check

1. Enter the CONTROL PANEL TEST menu by steps 1 through 7 of Section 3-4-3.
   When the check is carried out from step (5) continuously, carry out the check from step 2.
2. Press the monitor select keys shown in Fig.3-4-17 in the following sequence.

   ① SHIFT key + R [A4] : T
   ② SHIFT key + L [A3] : C
   ③ L [CUE] : 5
   ④ WFM [AUX]

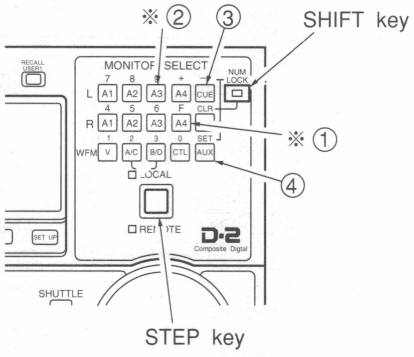


Fig.3-4-17 LD-44 Check (1)

3. Check that every LED shown in Fig.3-4-18 lights up.
4. Press the STEP key.
5. Check that each LED shown in Fig.3-4-18 lights up. (LED lights up from the bottom of left side to upward, and right side.)

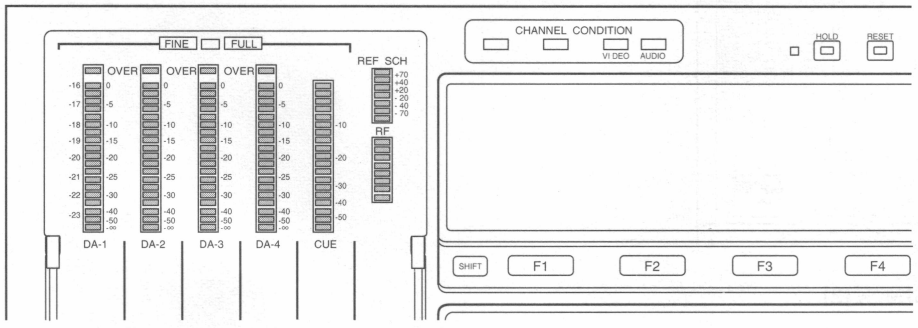


Fig.3-4-18 LD-44 Check (2)

6. Press the STEP key.
7. Press the switch shown in Fig.3-4-19. Check that two LED (FINE and FULL) on both sides of the switch light up, while the switch is pressing.

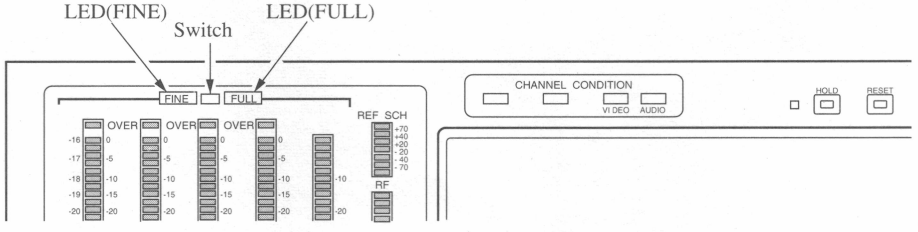


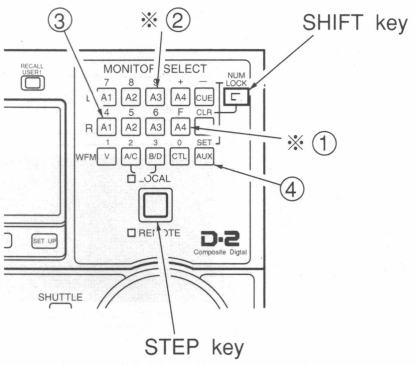
Fig.3-4-19 LD-44 Check (3)

8. Press the STEP key.
   To terminate or cancel the menu, return to the initial menu display by step 8 of Section 3-4-3.

(7) VR Ass'y check

1. Enter the CONTROL PANEL TEST menu by steps 1 through 7 of Section 3-4-3.
   When the check is carried out from step (6) continuously, carry out the check from step 2.
2. Press the monitor select keys shown in Fig.3-4-20 in the following sequence.

   ① SHIFT key + R [A4] : T
   ② SHIFT key + L [A3] : C
   ③ R [A1] : 6
   ④ WFM [AUX]



※ Press this key with the SHIFT key simultaneously.

Fig.3-4-20 VR Ass'y Check (1)

3. Turn the volume knobs shown in Fig.3-4-21 counterclockwise, and push-in the volume knobs. (5 pieces)
4. Check the display shown in the figure meets the following specification.
   Spec. : from 0000 to 0001 (HEX.)

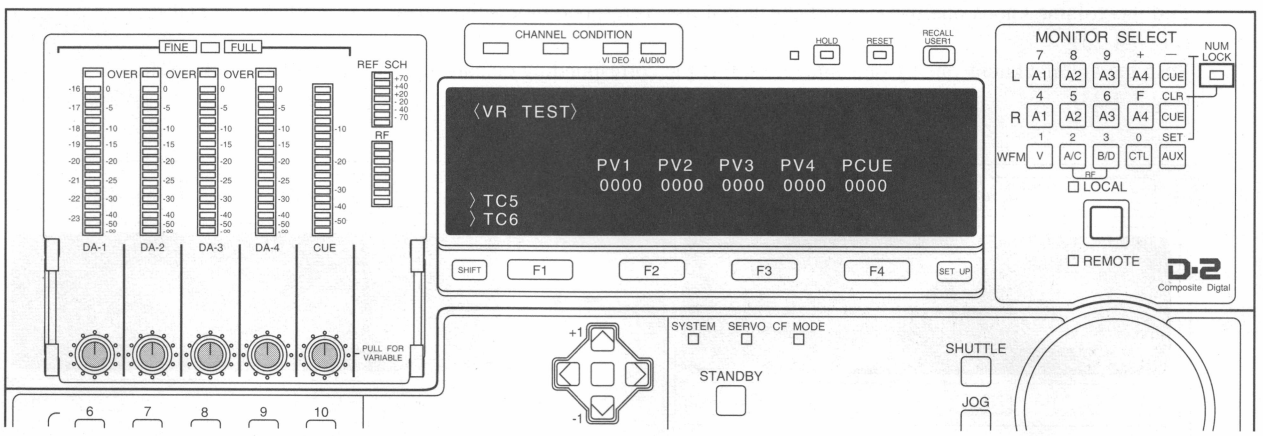


Fig.3-4-21 VR Ass'y Check (2)

5. Turn each volume knob clockwise slowly. Check that the corresponding display changes smoothly.(Fig.3-4-22)
   Change of the display: from 0000 to 03FE
6. Turn the volume knobs fully clockwise, and check that the display meets the following specification.
   Spec. : 03FE or 03FF (HEX.)
7. Turn the volume knobs fully counterclockwise, and check that the display meets the following specification.
   Spec. : 0000 or 0001 (HEX.)

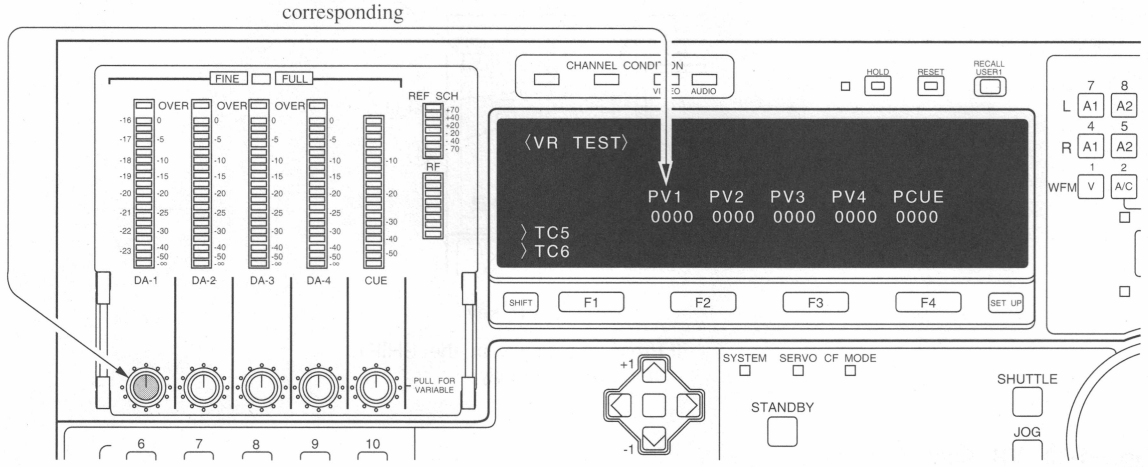


Fig.3-4-22 VR Ass'y Check (3)

8. Press the STEP key.
9. Check that the letters of PUSH appear on the display. (Fig.3-4-23)
10. Pull the volume knobs one by one, and check that the corresponding display changes from PUSH to PULL. (Fig.3-4-23)
11. Push the volume knobs one by one, and check that the corresponding display changes from PULL to PUSH. (Fig.3-4-23)

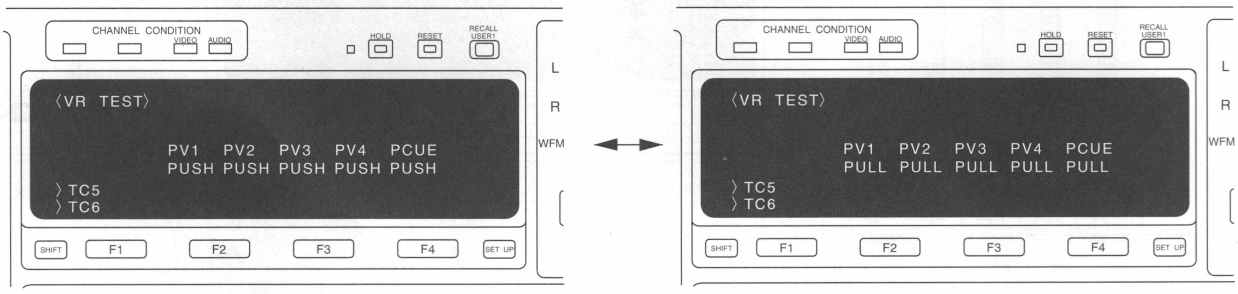


Fig.3-4-23 VR Ass'y Check (4)

12. Press the STEP key.
    To terminate or cancel the menu, return to the initial menu display by step 8 of Section 3-4-3.

(8) ES-03 check

1. Enter the CONTROL PANEL TEST menu by steps 1 through 7 of Section 3-4-3.
   When the check is carried out from step (7) continuously, carry out the check from step 2.
2. Press the monitor select keys shown in Fig.3-4-24 in the following sequence.

   ① SHIFT key + R [A4] : T
   ② SHIFT key + L [A3] : C
   ③ R [A2] : 7
   ④ WFM [AUX]

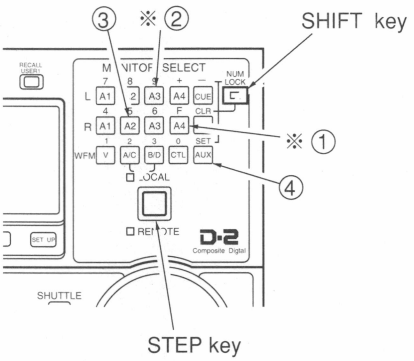
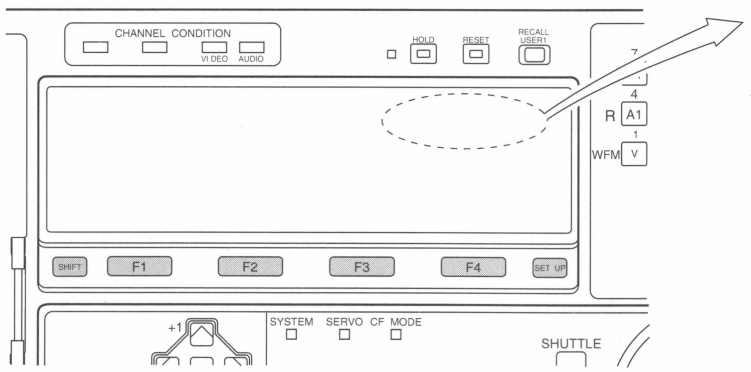


Fig.3-4-24 ES-03 Check (1)

3. Press each switch shown in Fig.3-4-25, and check that the corresponding display appears on the control panel.



Switches		Display
[SHIFT]	:	SHIFT KEY
[F1]	:	F1 KEY
[F2]	:	F2 KEY
[F3]	:	F3 KEY
[F4]	:	F4 KEY
[SET UP]	:	SET UP KEY

Fig.3-4-25 ES-03 Check (2)

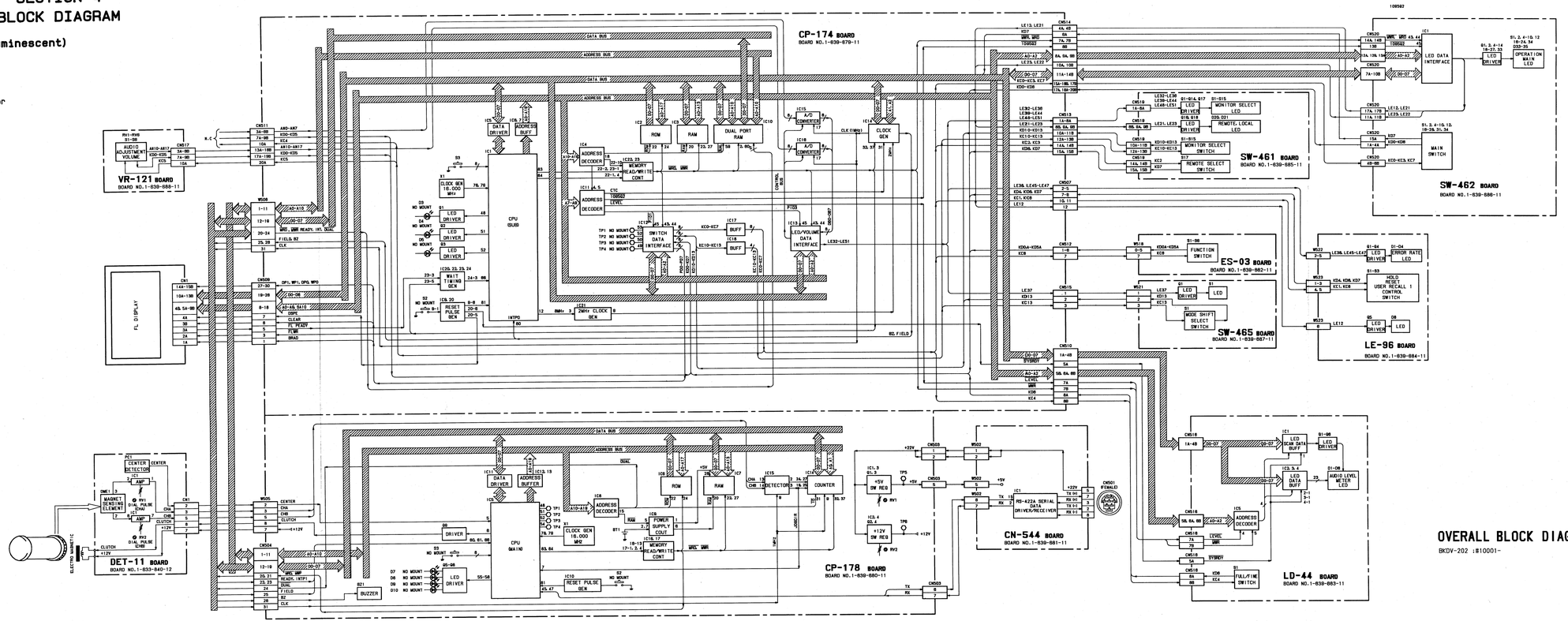
4. Press the STEP key.
   To terminate or cancel the menu, return to the initial menu display by step 8 of Section 3-4-3.

BLOCK DIAGRAM OVERALL OVERALL BLOCK DIAGRAM

SECTION 4
BLOCK DIAGRAM

FL Panel (Fluorescence Luminescent)

CN-544 BOARD ; 8 pin Connector
CP-174 BOARD ; Sub CPU
CP-178 BOARD ; Main CPU
DET-11 BOARD ; Switch Dial Detector
ES-03 BOARD ; Function Switch
LD-44 BOARD ; Audio Level Meter
LE-96 BOARD ; Channel Condition
SW-461 BOARD ; Monitor Select
SW-462 BOARD ; Main Switch
SW-465 BOARD ; Mode Shift Switch
VR-121 BOARD ; Audio Volume



4-1

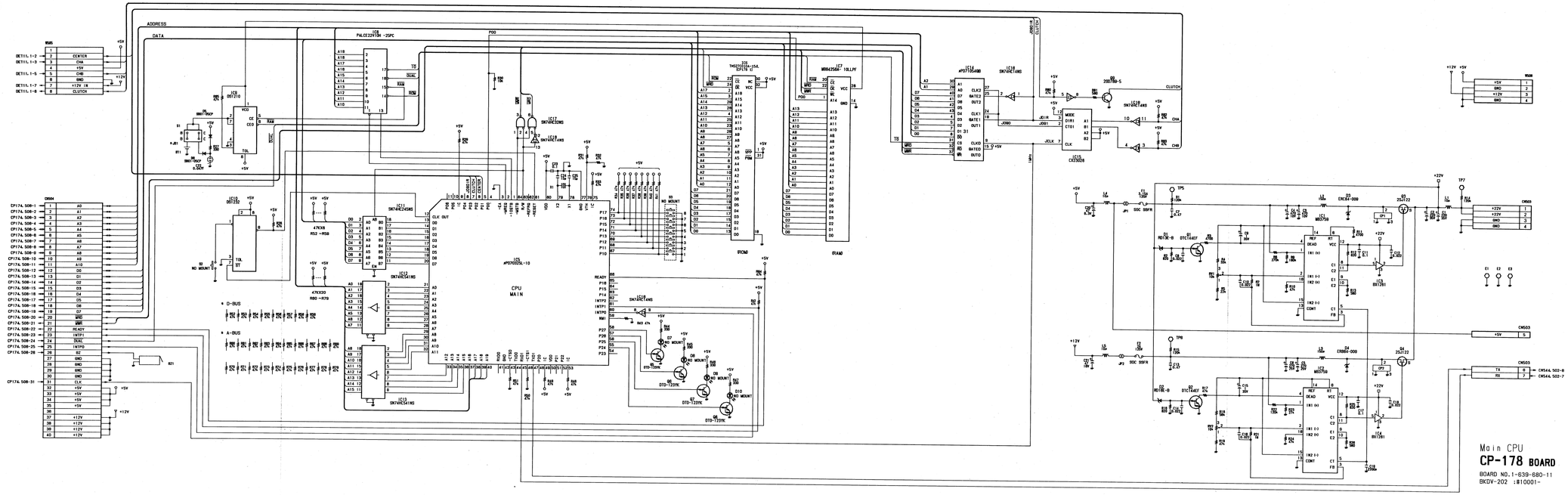
CP-178 BOARD CP-178 BOARD

SECTION 5
SCHEMATIC DIAGRAMS & BOARD LAYOUTS

5-1. SCHEMATIC DIAGRAMS

CP-178 BOARD

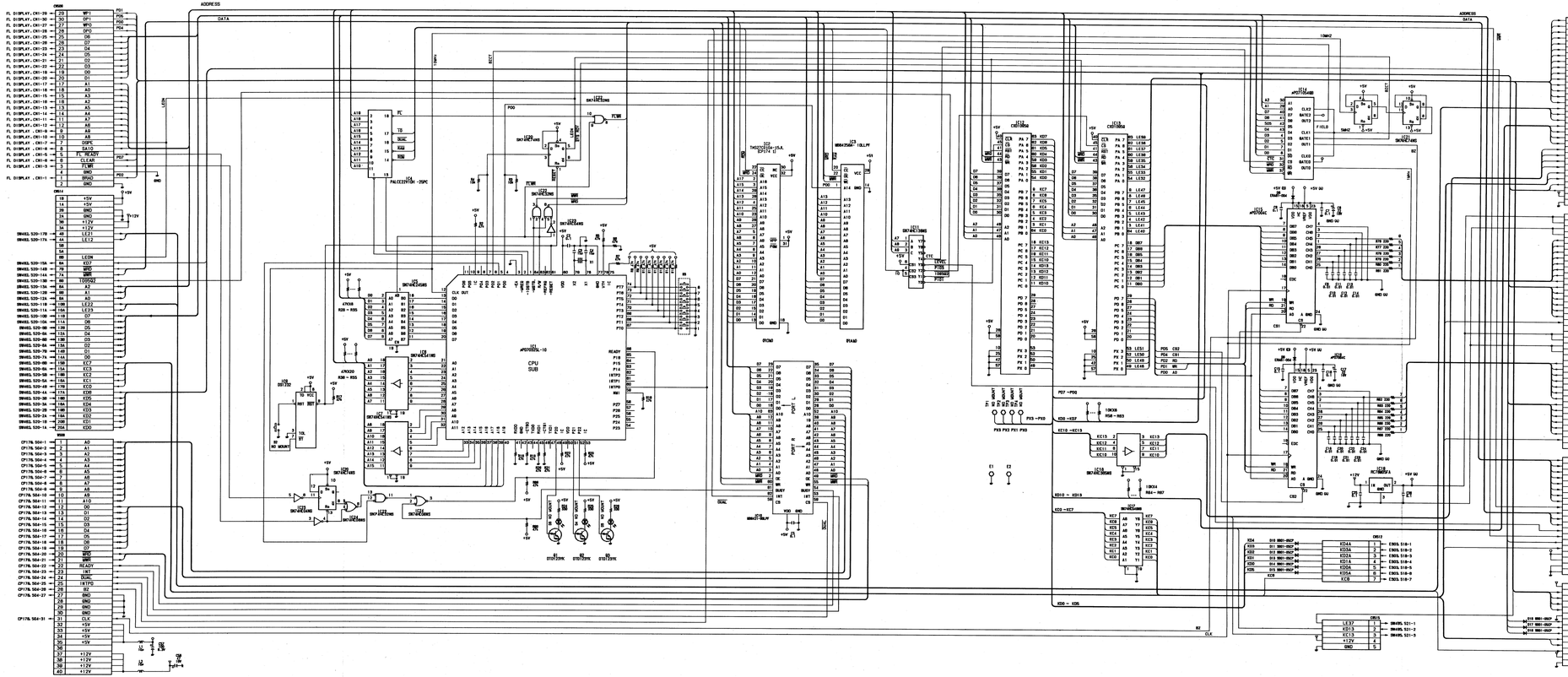
Main CPU



5-1

CP-174 BOARD CP-174 BOARD

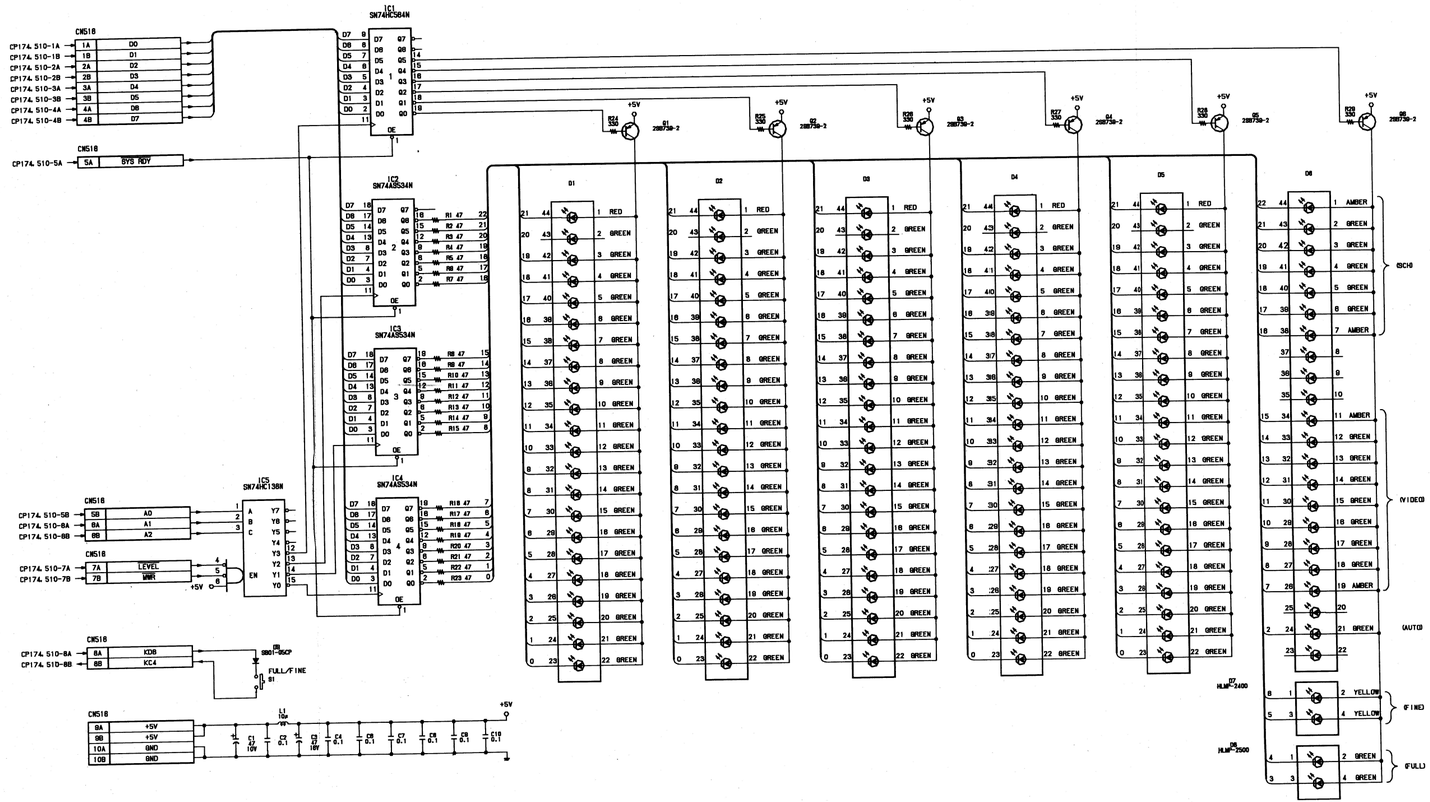
CP-174 BOARD
Sub CPU



5-3

Sub CPU
CP-174 BOARD
BOARD NO.1-369-679-11
8KDV-202 ±E1001-

LD-44 BOARD
Audio Level Meter

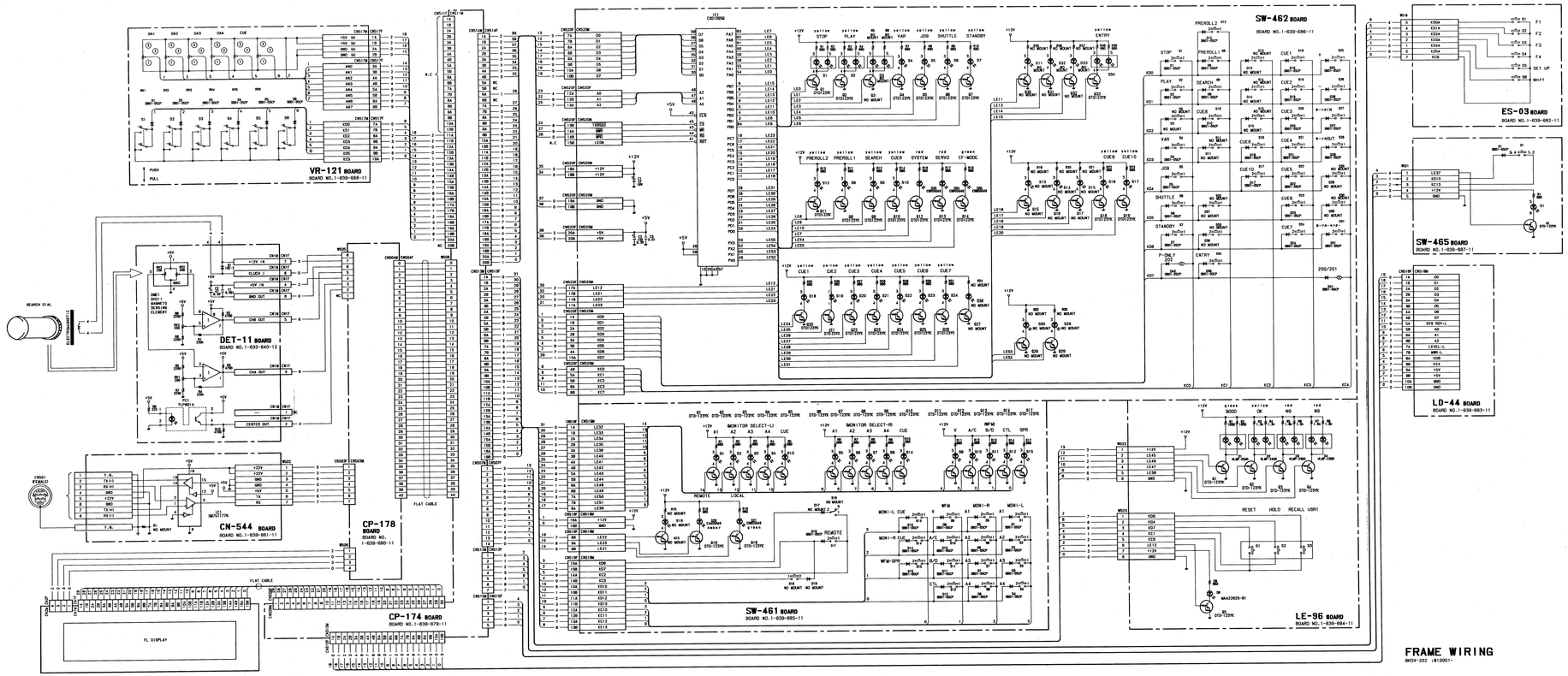


Audio Level Meter
LD-44 BOARD
BOARD NO.1-639-683-11
BKDV-202 :#10001-

FRAME WIRING FRAME WIRING

FRAME WIRING

CN-544 BOARD
DET-11 BOARD
ES-03 BOARD
LE-96 BOARD
SW-461 BOARD
SW-462 BOARD
SW-465 BOARD
VR-121 BOARD



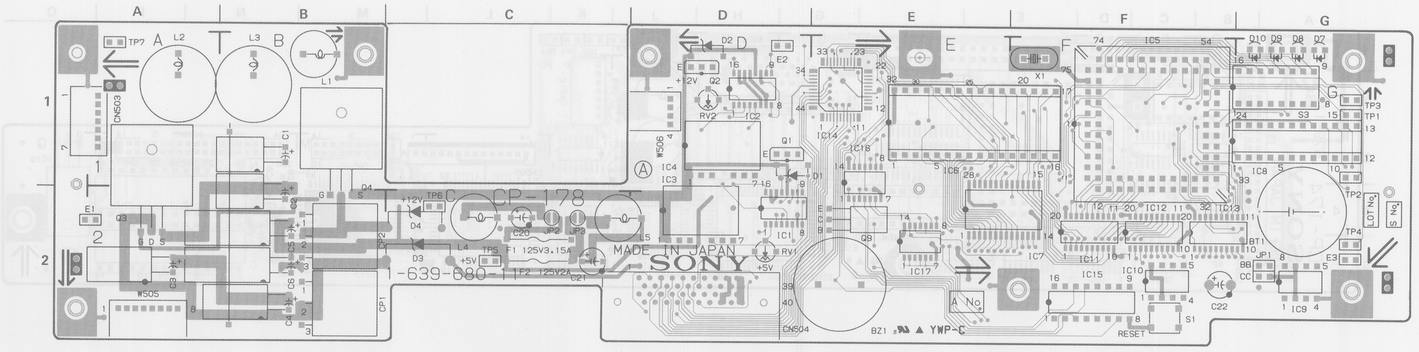
FRAME WIRING
BKDV-202 (81001-

5-7

5-2. BOARD LAYOUTS

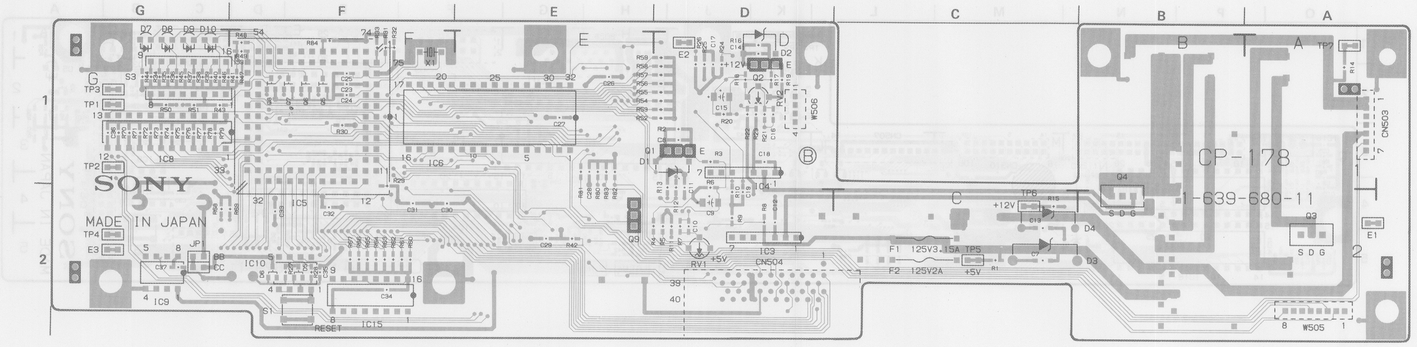
CP-178 BOARD (1-639-680-11)

A Side



CP-178 BOARD (1-639-680-11)

B Side



CP-178 (1-639-680-11)

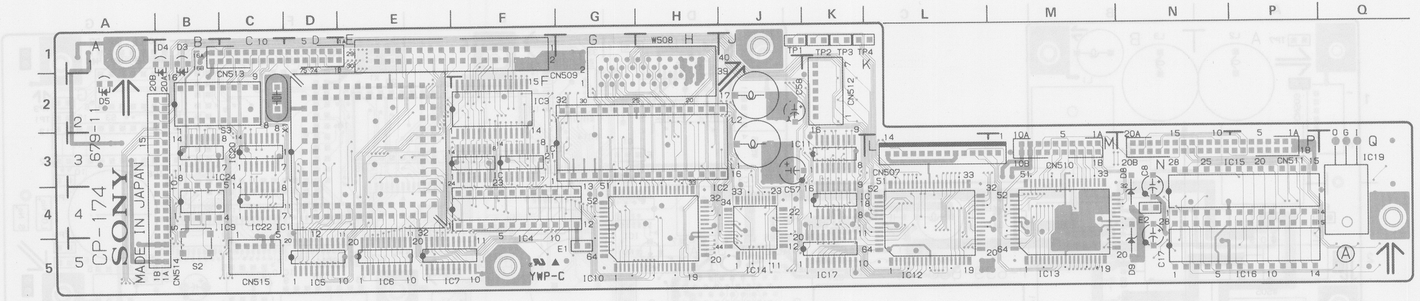
BT1	G-2		TP5	C-2
			TP6	C-2
BZ1	E-2		TP7	A-1
CN503	A-1		W505	A-1
CN504	D-2		W506	D-1
CP1	B-2		X1	F-1
CP2	B-2			
D1	E-1			
D2	D-1			
D3	C-2			
D4	C-2			
D5	F-2			
D6	F-2			
D7	G-1			
D8	G-1			
D9	G-1			
D10	G-1			
E1	A-2			
E2	D-1			
E3	G-2			
F1	C-2			
F2	C-2			
IC1	D-2			
IC2	D-1			
IC3	D-1			
IC4	D-1			
IC5	F-1			
IC6	E-1			
IC7	F-2			
IC8	G-1			
IC9	G-2			
IC10	F-2			
IC11	F-2			
IC12	F-2			
IC13	F-2			
IC14	E-1			
IC15	F-2			
IC16	E-1			
IC17	E-2			
Q1	D-1			
Q2	D-1			
Q3	A-2			
Q4	B-1			
Q5	F-1			
Q6	F-1			
Q7	F-1			
Q8	F-1			
Q9	E-2			
RV1	D-2			
RV2	D-1			
S1	F-2			
S3	G-1			
TP1	G-1			
TP2	G-1			
TP3	G-1			
TP4	G-2			

NOTE
•-• :•-•A SIDE
•-•(B):•-•B SIDE

CP-174, LD-44 BOARD

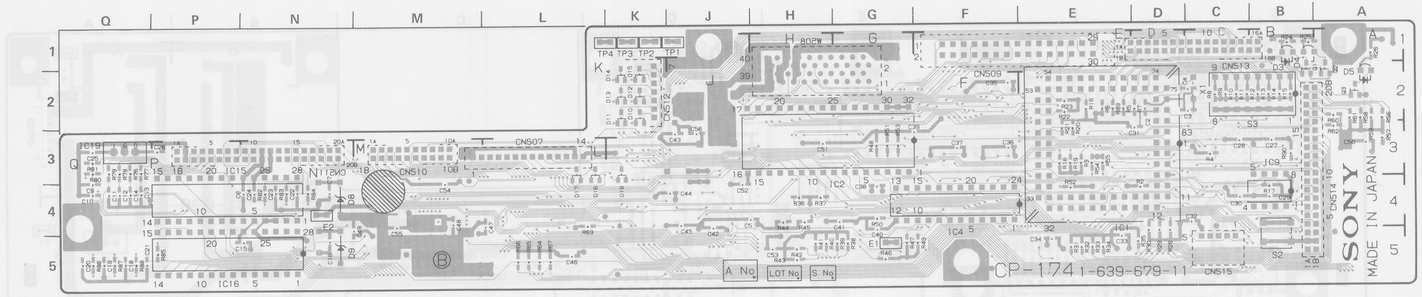
CP-174 BOARD (1-639-679-11)

A Side



CP-174 BOARD (1-639-679-11)

B Side



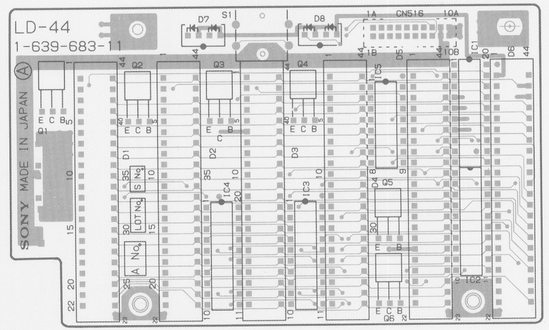
CP-174 (1-639-679-11)

CN507	L-3
CN509	G-2
CN510	M-3
CN511	P-3
CN512	K-2
CN513	C-2
CN514	B-5
CN515	C-5
D3	B-1
D4	B-1
D5	A-2
D8	N-3
D9	N-5
D10	K-2 (B)
D11	K-2 (B)
D12	K-2 (B)
D13	K-2 (B)
D14	K-2 (B)
D15	K-2 (B)
D16	L-4 (B)
D17	L-4 (B)
D18	K-4 (B)
E1	G-5
E2	N-4
IC1	A-4
IC2	J-4
IC3	F-2
IC4	F-5
IC5	D-5
IC6	E-5
IC7	E-5
IC9	C-4
IC10	G-5
IC11	K-3
IC12	K-5
IC13	M-5
IC14	J-5
IC15	P-3
IC16	P-5
IC17	K-5
IC18	K-4
IC19	Q-3
IC20	C-3
IC21	F-3
IC22	C-4
IC23	F-3
IC24	B-3
Q1	B-2 (B)
Q2	A-2 (B)
Q3	A-2 (B)
S2	B-5
S3	C-2
TP1	J-1
TP2	K-1
TP3	K-1
TP4	K-1
W508	H-1
X1	D-2

NOTE
•-• : •-•A SIDE
•-•(B): •-•B SIDE

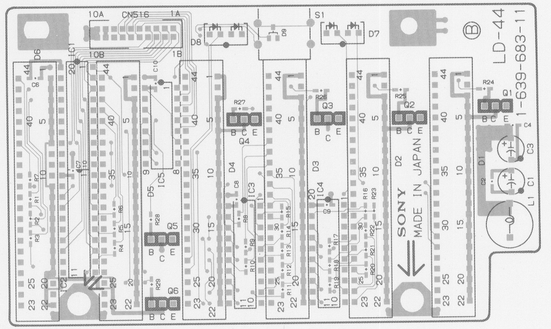
LD-44 BOARD (1-639-683-11)

A Side



LD-44 BOARD (1-639-683-11)

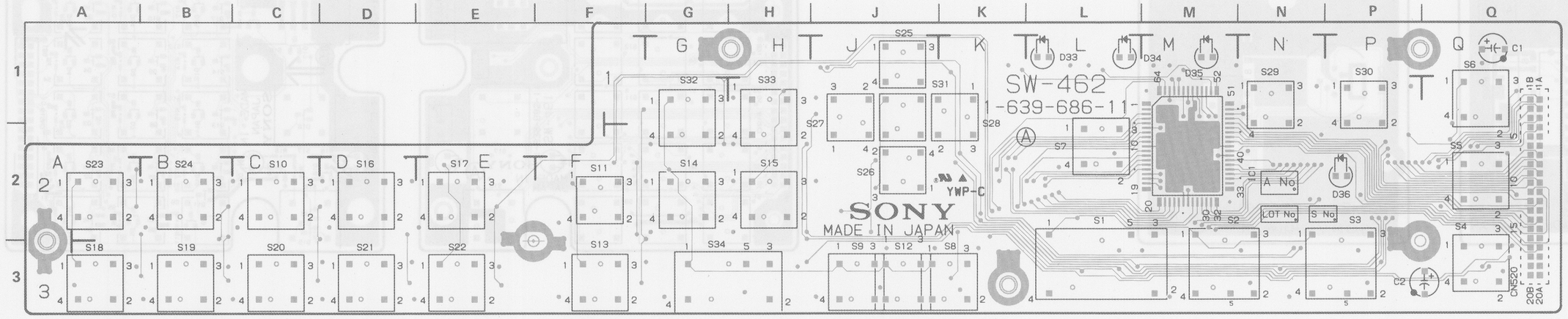
B Side



5-10

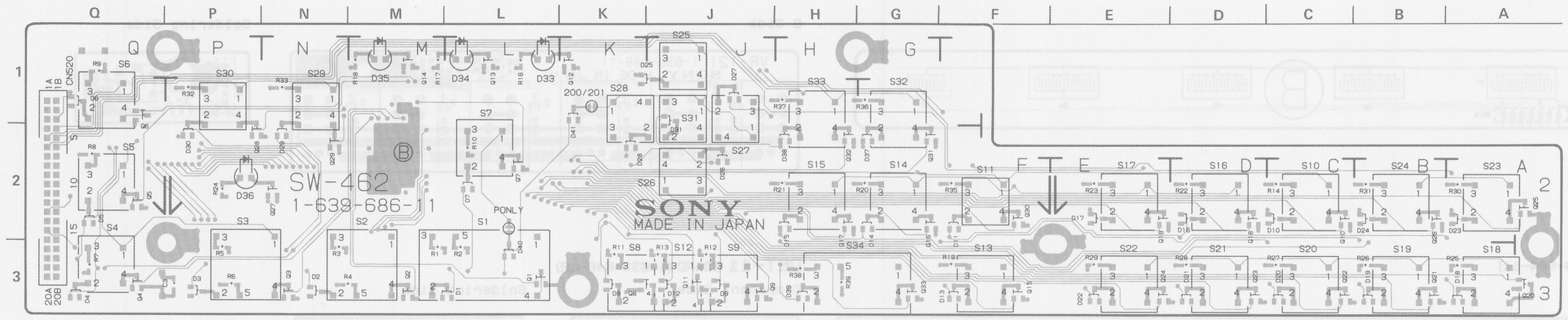
SW-462 BOARD (1-639-686-11)

A Side



SW-462 BOARD (1-639-686-11)

B Side



SW-462 (1-639-686-11)

CN520	Q-1 (B)	Q22	C-3 (B)
		Q23	D-3 (B)
D1	L-3 (B)	Q24	E-3 (B)
D2	N-3 (B)	Q25	A-2 (B)
D3	P-3 (B)	Q26	B-2 (B)
D4	Q-3 (B)	Q27	N-2 (B)
D5	Q-2 (B)	Q28	P-2 (B)
D6	Q-1 (B)	Q29	N-2 (B)
D7	L-2 (B)	Q30	F-2 (B)
D8	K-3 (B)	Q31	G-2 (B)
D9	J-3 (B)	Q32	H-2 (B)
D10	C-2 (B)	Q33	G-3 (B)
D11	F-2 (B)		
D12	J-3 (B)	S1	L-2
D13	F-3 (B)	S2	M-2
D14	G-2 (B)	S3	P-2
D15	H-2 (B)	S4	Q-3
D16	D-2 (B)	S5	Q-2
D17	E-2 (B)	S6	Q-1
D18	A-3 (B)	S7	L-2
D19	B-3 (B)	S8	K-3
D20	C-3 (B)	※S9	J-3
D21	D-3 (B)	※S10	C-2
D22	E-3 (B)	※S11	F-2
D23	A-2 (B)	※S13	F-3
D24	B-2 (B)	※S14	G-2
D25	J-1 (B)	※S15	H-2
D26	J-2 (B)	※S16	D-2
D27	J-1 (B)	※S17	E-2
D28	K-2 (B)	※S18	A-3
D29	N-2 (B)	※S19	B-3
D30	P-2 (B)	※S20	C-3
D31	J-1 (B)	※S21	D-3
D33	L-1	※S22	E-3
D34	M-1	※S23	A-2
D35	M-1	※S24	B-2
D36	P-2	S25	J-1
D37	G-2 (B)	S26	J-2
D38	H-2 (B)	S27	J-1
D39	H-3 (B)	S28	K-1
D40	L-3 (B)	※S29	N-1
D41	K-1 (B)	※S30	P-1
		S31	K-1
IC1	N-2	※S32	G-1
		※S33	H-1
Q1	L-3 (B)	S34	G-3
Q2	M-3 (B)		
Q3	N-3 (B)		
Q4	Q-3 (B)		
Q5	Q-2 (B)		
Q6	Q-1 (B)		
Q7	L-2 (B)		
Q8	K-3 (B)		
Q9	J-3 (B)		
Q10	C-2 (B)		
Q11	J-3 (B)		
Q12	K-1 (B)		
Q13	L-1 (B)		
Q14	M-1 (B)		
Q15	F-3 (B)		
Q16	G-2 (B)		
Q17	H-2 (B)		
Q18	D-2 (B)		
Q19	E-2 (B)		
Q20	A-3 (B)		
Q21	B-3 (B)		

NOTE
•-• : •-•A SIDE
•-•(B); •-•B SIDE

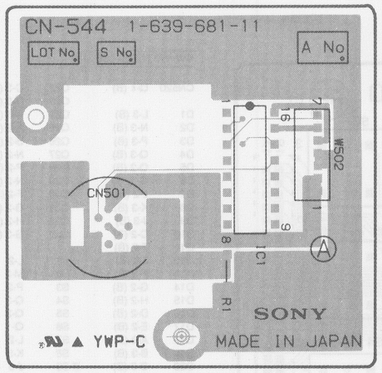
※; Only for BKDV-201

5-11

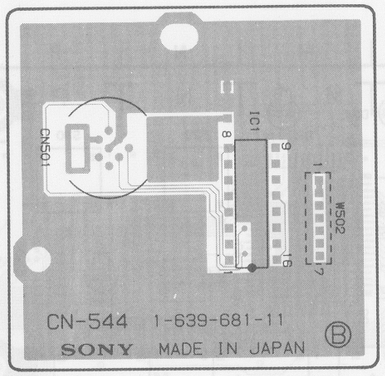
FRAME WIRING
CN-544, DET-11, ES-03, LE-96
SW-461, SW-465, VR-121

CN-544 BOARD (1-639-681-11)

A Side

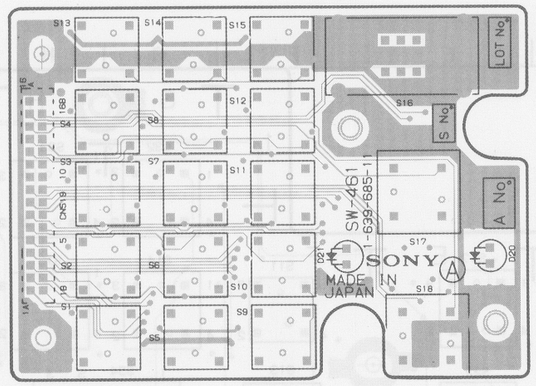


B Side

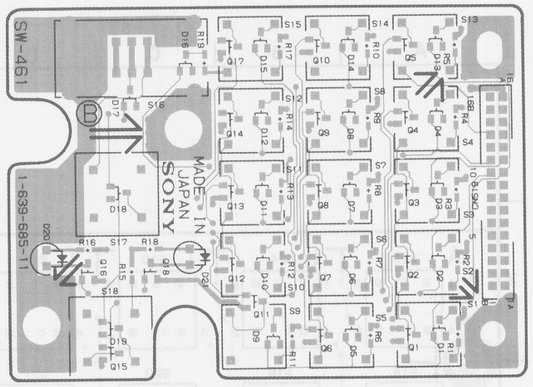


SW-461 BOARD (1-639-685-11)

A Side



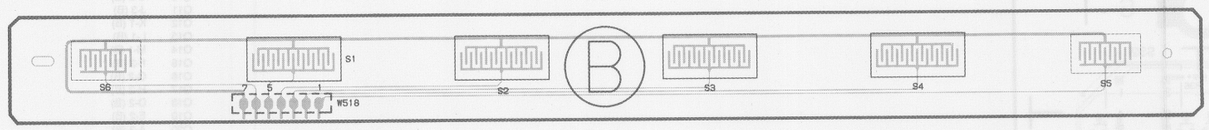
B Side



ES-03 BOARD (1-639-682-11)

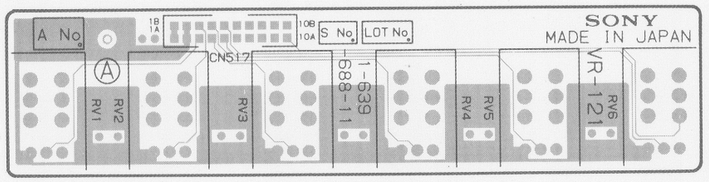
A Side

B Side

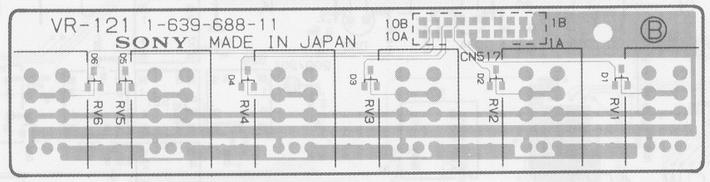


VR-121 BOARD (1-639-688-11)

A Side

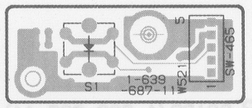


B Side

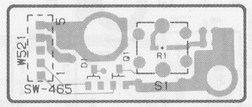


SW-465 BOARD (1-639-687-11)

Component Side

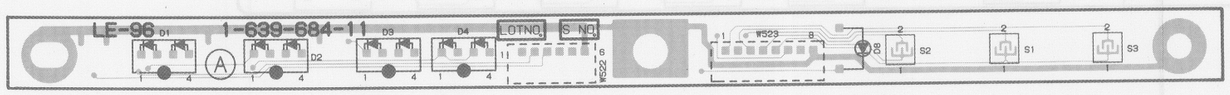


Soldering Side

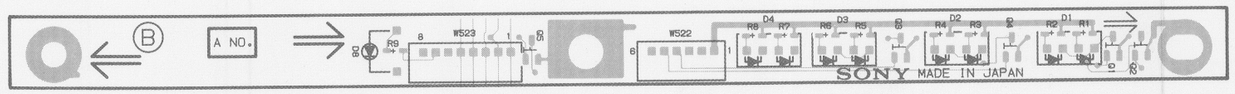


LE-96 BOARD (1-639-684-11)

A Side

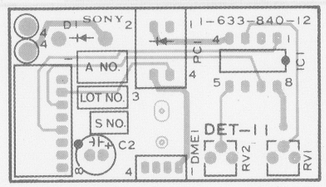


B Side

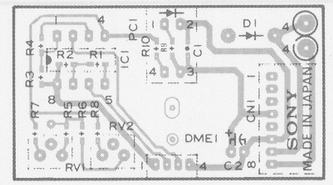


DET-11 BOARD (1-633-840-12)

Component Side



Soldering Side



5-12

SECTION 6
SEMICONDUCTOR PIN ASSIGNMENT

この章の図の中には互換性のないダイオード、トランジスタ、ICが併記されていることがあります。部品を交換するときには必ず部品表を参照してください。
等価回路はICメーカーのData Bookに従いました。

The chart in this section may sometimes show diodes, transistors, and ICs that are not interchangeable. When replacing a component, be sure to refer to the parts list.

The circuit diagram of each IC is obtained from the IC data book published by the manufacturer.

TYPE **PAGE**

2SB739 6-2
DM211A 6-2
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DS1232 6-3
DTC144EF.....6-2

DTD123YK 6-2
EAA5504S 6-2
EBG5504S 6-2
EBR5504S 6-2
ERB84-009 6-2

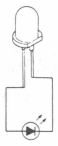
ERC84-009 6-2
HLMP-2300.....6-2
HLMP-2400.....6-2
HLMP-2500.....6-2
MAA2262S-B1 6-2

MB3759PF.....6-3
MB84256-10LLPF.....6-3
MB84256A-10LLPF...6-3
RD ? ?EB ? 6-2
SB01-05CP 6-2

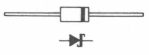
SN74AS534N 6-4
SN74HC365ANS.....6-4
SN74HC540ANS.....6-4
TLP801A 6-2
TLR214.....6-2

UPD70325L-10.....6-4

NOTE:
上記以外の半導体については、VTR本体のメンテナンスマニュアルVol-2をご覧下さい。
Refer to Maintenance Manual Vol-2 of the VTR for the semiconductors except for the above-mentioned diodes, transistors and ICs.

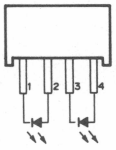


EAA5504S ; AMBER
EBG5504S ; GREEN
EBR5504S ; RED



ERB84-009
ERC84-009

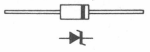
– SIDE VIEW –



HLMP-2300 ; RED
HLMP-2400 ; YELLOW
HLMP-2500 ; GREEN

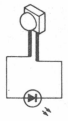
(SCALE 2/1)

MAA2262S-B1 ; ORANGE

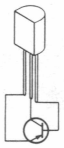


RD ? ?EB ?

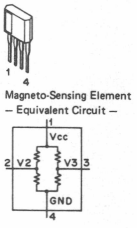
SB01-05CP



TLR214 ; RED

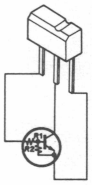


2SB739



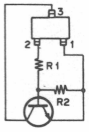
DM211A

(SCALE 2/1)

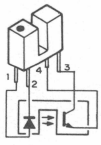


DTC144EF (R1 = 47K, R2 = 47K)

TOP VIEW (SCALE 4/1)



DTD123YK (R1 = 2.2K, R2 = 10K)

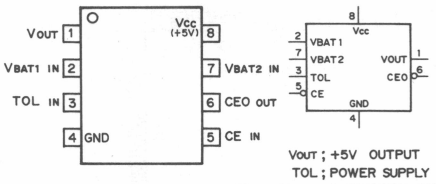


TLP801A

DS1210 (DALLAS SEMICONDUCTOR)

NONVOLATILE CONTROLLER

– TOP VIEW –

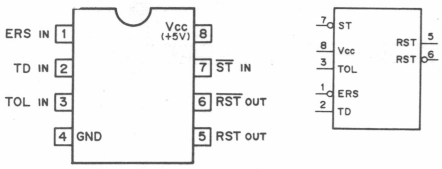


VOUT ; +5V OUTPUT
TOL ; POWER SUPPLY TOLERANCE INPUT
VBAT1, VBAT2 ; + BATTERY INPUTS
CE ; CHIP ENABLE INPUT
CEO ; CHIP ENABLE OUTPUT

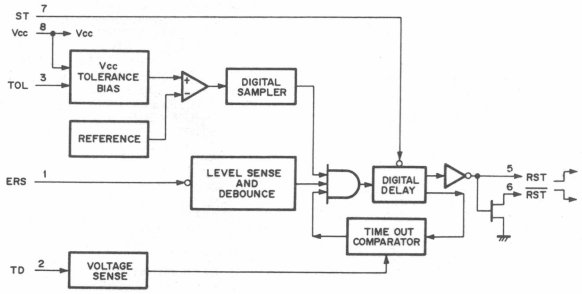
DS1232 (DALLAS SEMICONDUCTOR)

MPU MONITOR

– TOP VIEW –



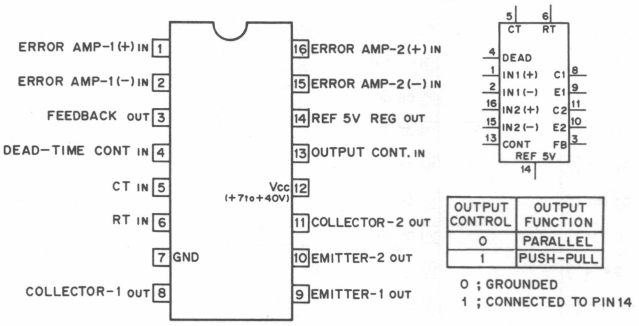
ERS : EXTERNAL RESET INPUT
RST : RESET OUTPUT (⌐‾)
RST : RESET OUTPUT (‾⌐ OPEN DRAIN)
ST : STROBE INPUT
TD : TIMER SELECT
TOL : Vcc TRIP SELECT



MB3759PF (FUJITSU) FLAT PACKAGE

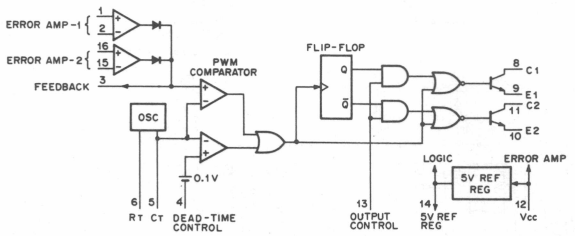
PWM POWER CONTROL

– TOP VIEW –



OUTPUT CONTROL	OUTPUT FUNCTION
0	PARALLEL
1	PUSH-PULL

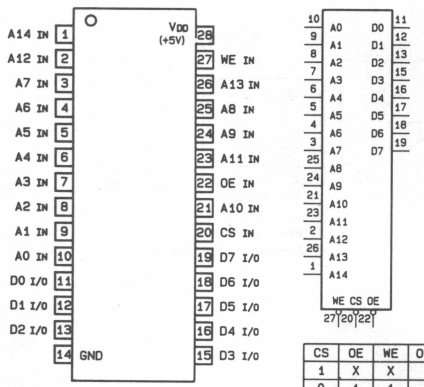
0 ; GROUNDED
1 ; CONNECTED TO PIN 14



MB84256-10LLPF (FUJITSU) (ACCESS TIME = 100nS) FLAT PACKAGE
MB84256A-10LLPF (FUJITSU) (ACCESS TIME = 100nS) FLAT PACKAGE

C-MOS 256K (32768x8)-BIT STATIC RAM

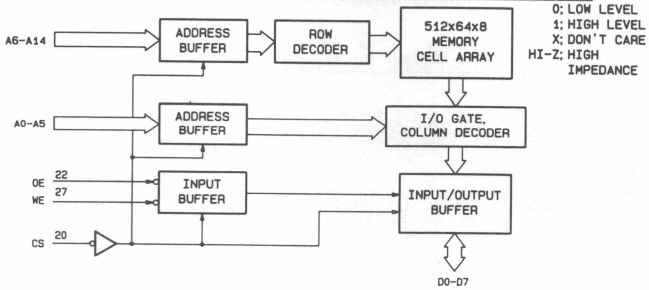
– TOP VIEW –



A0–A14; ADDRESS INPUTS
D0–D7; DATA INPUTS/OUTPUTS
CS; CHIP SELECT INPUT
OE; OUTPUT ENABLE INPUT
WE; WRITE ENABLE INPUT

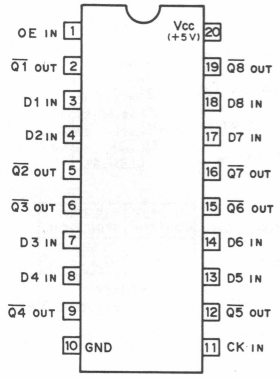
CS	OE	WE	OUTPUTS	FUNCTION
1	X	X	HI-Z	NO SELECTION
0	1	1	HI-Z	OUTPUT DISABLE
0	0	1	DOUT	READ
0	X	0	DIN	WRITE

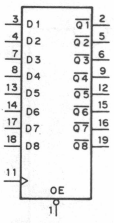
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE



SN74AS534N (TI)

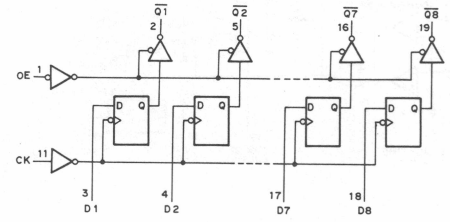
TTL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS
– TOP VIEW –





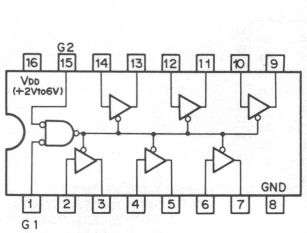
INPUTS			OUTPUT
OE	CK	D	Q
0	↑	1	0
0	↑	0	1
0	0	X	Q_0
1	X	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE



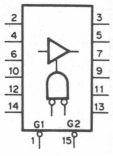
SN74HC365ANS (TI) FLAT PACKAGE

C-MOS 3-STATE BUS DRIVER
– TOP VIEW –



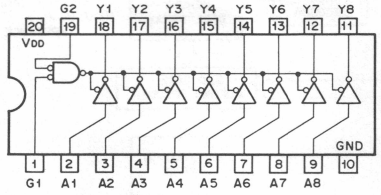
G1	G2	A	Y
0	0	0	0
0	0	1	1
0	1	X	HI-Z
1	0	X	HI-Z
1	1	X	HI-Z

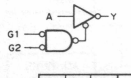
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE



SN74HC540ANS (TI) FLAT PACKAGE

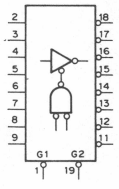
C-MOS 3-STATE INVERTING BUFFER/LINE DRIVER/LINE RECEIVER
– TOP VIEW –





G1	G2	A	Y
0	0	0	1
0	0	1	0
1	X	X	HI-Z
X	1	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

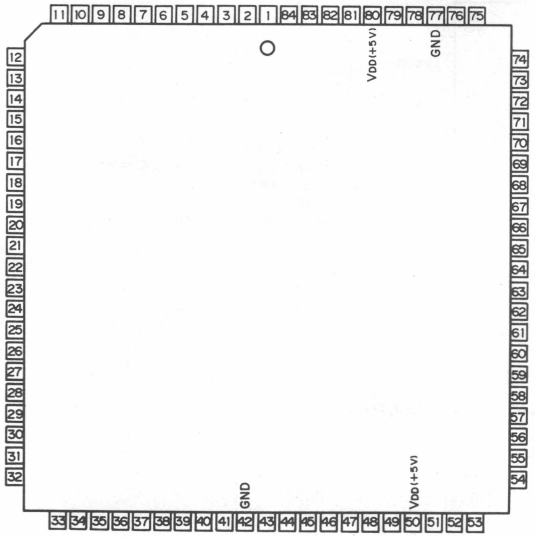


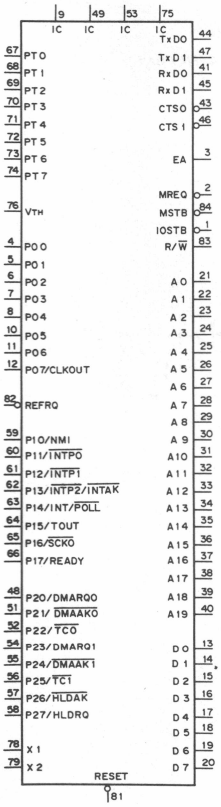
NOTE :

TYPE	VDD
TC74AC540F TC74AC540P	+5V
OTHER TYPES	+2 to +6V

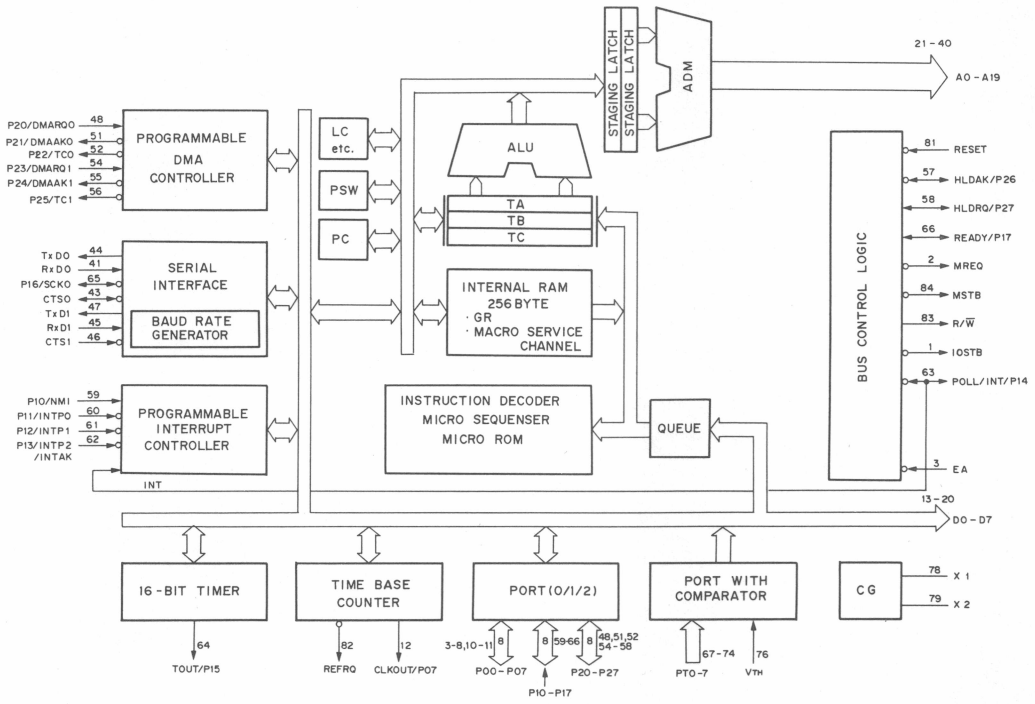
UPD70325L-10 (NEC)

C-MOS 16-BIT MICROPROCESSOR
– TOP VIEW –





A0 – A19	; ADDRESS BUS OUTPUTS
CLKOUT	; SYSTEM CLOCK OUTPUT
CTS0, CTS1	; CLEAR TO SEND INPUT/OUTPUT
D0 – D7	; DATA BUS INPUTS/OUTPUTS
DMAAK0, DMAAK1	; DMA ACKNOWLEDGE CH0, CH1 OUTPUTS
DMARQ0, DMARQ1	; DMA REQUEST CH0, CH1 INPUTS
EA	; ROM-LESS MODE SET INPUT
HLDAK	; HOLD ACKNOWLEDGE OUTPUT
HLDRQ	; HOLD REQUEST INPUT
IC	; INTERNAL CONNECT
INTP0, INTP1	; INTERRUPT REQUEST INPUTS
INTP2	; INTERRUPT REQUEST INPUT
INTAK	; INTERRUPT ACKNOWLEDGE OUTPUT
IOSTB	; I/O READ/WRITE STROBE OUTPUT
MREQ	; MEMORY REQUEST OUTPUT
MSTB	; MEMORY READ/WRITE STROBE OUTPUT
NMI	; NON-MASKABLE INTERRUPT INPUT
P00 – P07	; PORT 0 INPUTS/OUTPUTS
P10 – P17	; PORT 1 INPUTS/OUTPUTS
P20 – P27	; PORT 2 INPUTS/OUTPUTS
PT0 – PT7	; PORT 0 INPUTS
INT/POLL	; INTERRUPT REQUEST INPUT
READY	; READY INPUT
REFRQ	; REFRESH REQUEST OUTPUT
RESET	; RESET INPUT
R/W	; READ AND WRITE CYCLE OUTPUT
RXD0, RXD1	; SERIAL DATA INPUTS
SCKO	; SERIAL CLOCK OUTPUT
TC0, TC1	; DMA (CH0/CH1) ENDING OUTPUTS
TOUT	; TIMER OUTPUT
TXD0, TXD1	; SERIAL DATA OUTPUTS
VTH	; REF. V FOR COMPARATOR INPUT
X1, X2	; CRYSTAL 1, 2



PIN No.	I/O	SYMBOL	PIN No.	I/O	SYMBOL	PIN No.	I/O	SYMBOL
1	O	IOSTB	29	O	A8	57	I/O	P26/HLDAK
2	O	MREQ	30	O	A9	58	I/O	P27/HLDRQ
3	I	EA	31	O	A10	59	I/O	P10/NMI
4	I/O	P00	32	O	A11	60	I/O	P11/INTP0
5	I/O	P01	33	O	A12	61	I/O	P12/INTP1
6	I/O	P02	34	O	A13	62	I/O	P13/INTP2/INTAK
7	I/O	P03	35	O	A14	63	I/O	P14/INT/POLL
8	I/O	P04	36	O	A15	64	I/O	P15/TOUT
9	—	IC	37	O	A16	65	I/O	P16/SCKO
10	I/O	P05	38	O	A17	66	I/O	P17/READY
11	I/O	P06	39	O	A18	67	I	PT0
12	I/O	P07/CLKOUT	40	O	A19	68	I	PT1
13	I/O	D0	41	I	RXD0	69	I	PT2
14	I/O	D1	42	—	GND	70	I	PT3
15	I/O	D2	43	I/O	CTS0	71	I	PT4
16	I/O	D3	44	O	TXD0	72	I	PT5
17	I/O	D4	45	I	RXD1	73	I	PT6
18	I/O	D5	46	I	CTS1	74	I	PT7
19	I/O	D6	47	O	TXD1	75	—	IC
20	I/O	D7	48	I/O	P20/DMARQ0	76	I	V_{TH}
21	O	A0	49	—	IC	77	—	GND
22	O	A1	50	I	V_{DD}(+5V)	78	—	X1
23	O	A2	51	I/O	P21/DMAAK0	79	—	X2
24	O	A3	52	I/O	P22/TC0	80	I	V_{DD}(+5V)
25	O	A4	53	—	IC	81	I	RESET
26	O	A5	54	I/O	P23/DMARQ1	82	O	REFRQ
27	O	A6	55	I/O	P24/DMAAK1	83	O	R/W
28	O	A7	56	I/O	P25/TC1	84	O	MSTB

SECTION 7
REPLACEABLE PARTS & OPTIONAL FIXTURE

7-1. 補修用部品注意事項

(1) 安全重要部品

回路図、分解図、電気部品表中、⚠印の部品は安全性を維持するために重要な部品です。従ってこれらの部品を交換するときには必ず指定の部品と交換して下さい。

(2) 部品の共通化

ソニーから供給される部品はセットに実装されているものと異なることがあります。これは部品の共通化、改良等によるものです。
分解図や電気部品表には現時点での共通化された部品が記載されています。

(3) 部品の変更

部品の変更に関する情報は第8章「CHANGED PARTS」を参照して下さい。

(4) 部品の在庫

部品表のSP (Supply code) 欄にoで示される部品は交換頻度が低い部品ですので在庫していないことがあり、納期が長くなることがあります。

(5) コンデンサ、インダクタ、抵抗の単位

回路図、分解図、電気部品表中、特に明記したものを除き、下記の単位は省略されています。

コンデンサ：μF
インダクタ：μH
抵抗　　：Ω

7-1. NOTES ON REPAIR PARTS

(1) Safety Related Components Warning

Components marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation.
Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts

Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to accommodating improved parts and/or engineering changes or standardization of genuine parts.
This manual's exploded views and electrical spare parts list indicate the part numbers of current standardized genuine parts.

(3) Change of Parts

Regarding engineering parts changes, refer to Section 8. CHANGED PARTS.

(4) Stock of Parts

Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional time for delivery.

(5) Units for Capacitors, Inductors and Resistors

The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

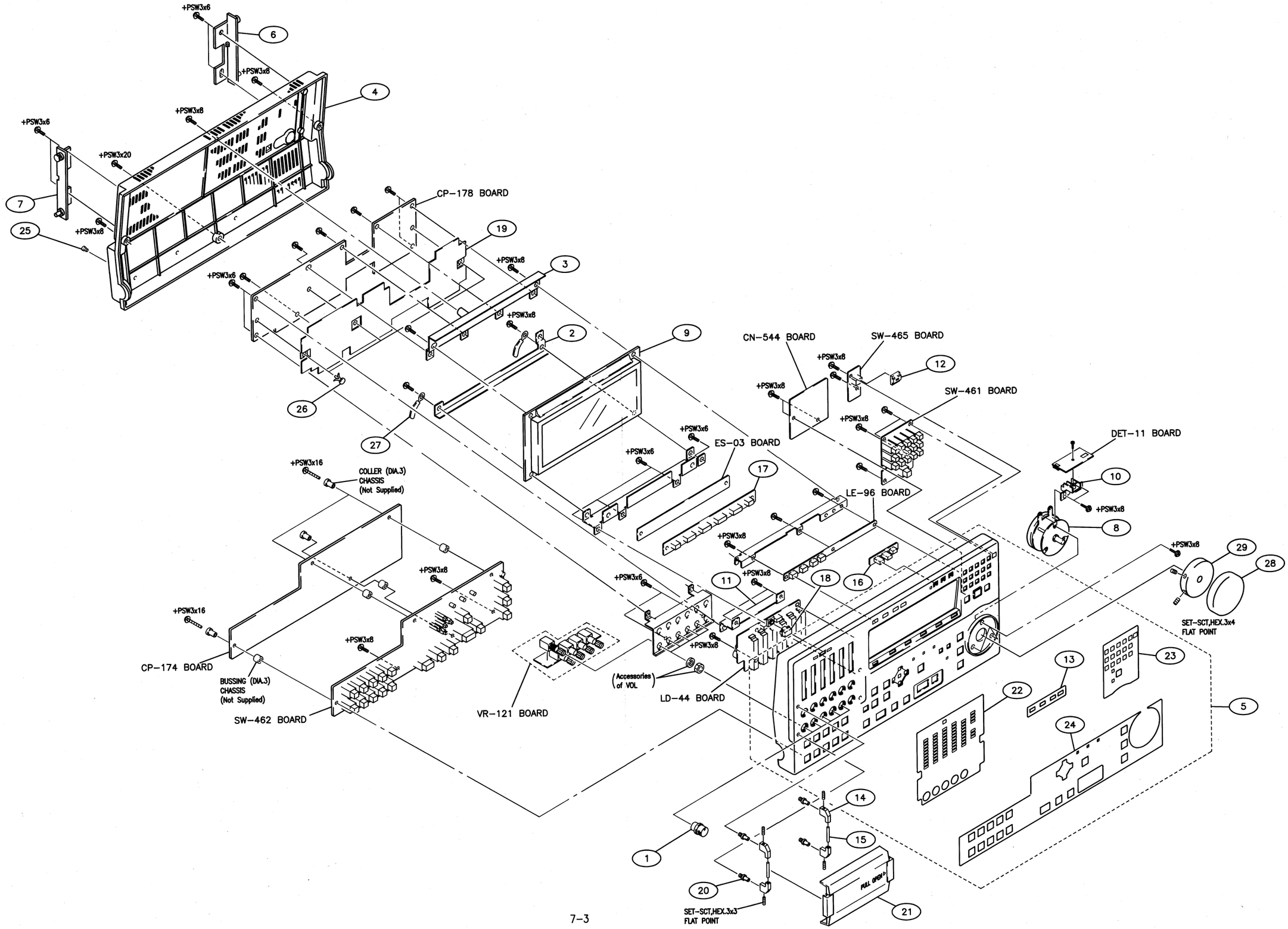
Capacitors: μF
Inductors: μH
Resistors: ohm

7-2. EXPLODED VIEW

FUNCTION CONTROL PANEL BLOCK BKDV-202

No.	Part No.	SP	Description
1	X-3165-983-3	o	KNOB ASSY (WHITE), VOL
2	X-3165-986-1	o	BRACKET (2) ASSY, PS
3	X-3165-987-2	o	BRACKET (1) ASSY, PS
4	X-3166-222-3	o	PLATE ASSY, BOTTOM
5	X-3166-773-1	o	PANEL ASSY, 202
6	X-3715-476-2	o	PLATE (RIGHT) ASSY, INDICATION
7	X-3715-477-2	o	PLATE (LEFT) ASSY, INDICATION
8	1-454-569-12	s	CLATCH, ELECTROMAGNETIC
9	1-809-435-11	s	MODULE,FLUORESCENCE INDICATION
10	2-143-746-02	o	HOLDER, DME
11	3-170-877-02	o	PLATE, FIXED, CP PC BOARD
12	3-170-878-01	o	KEY TOP, TACT SWITCH
13	3-170-885-01	o	SHEET, CHANNEL CONDITION
14	3-170-886-03	o	GUARD, VOL
15	3-170-887-02	o	SHAFT, VOL GUARD
16	3-170-888-01	o	KEY (1), RUBBER
17	3-170-889-01	o	KEY (2), RUBBER
18	3-170-892-01	o	KNOB, SWITCH
19	3-170-897-02	o	INSULATOR, CP178
20	3-173-180-01	o	PIN, VOL GUARD FITTING
21	3-173-181-01	o	COVER, VOL GUARD
22	3-177-096-01	o	SHEET (1), METER PANEL
23	3-177-098-01	o	SHEET (1), MONITOR SELECT
24	3-177-099-01	o	SHEET (1), KEY, MAIN
25	3-351-878-01	s	FOOT, RUBBER
26	3-531-576-11	s	RIVET
27	3-701-822-00	o	HOLDER, WIRE
28	3-714-595-01	o	KNOB, DIAL
29	3-714-596-01	o	DIAL

EXPLODED VIEW



7-3. ELECTRICAL PARTS LIST

CN-544 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-6017-174-A	o	MOUNTED CIRCUIT BOARD, CN-544
1pc	1-569-194-11	o	CONTACT, FEMALE AWG24-30
2pcs	7-682-948-01	s	SCREW +PSW 3X8
2pcs	7-684-023-04	s	N 3, TYPE 2
CN100	1-948-621-11	o	HARNESS, NCP-12
CN501	1-563-769-11	s	CONNECTOR, 8P, FEMALE
CN503	1-569-200-11	o	HOUSING, 7P
IC1	8-759-518-78	s	IC SN751177N

CP-174 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-6017-175-A	o	MOUNTED CIRCUIT BOARD, CP-174
1pc	3-571-485-00	s	CUSHION
C2	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C3	1-163-097-00	s	CERAMIC, CHIP 15PF 5% 50V
C4	1-163-097-00	s	CERAMIC, CHIP 15PF 5% 50V
C5	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C6	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C7	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C8	1-124-234-00	s	ELECT 22uF 20% 16V
C9	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C10	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C11	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C12	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C13	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C14	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C15	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C16	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C17	1-124-234-00	s	ELECT 22uF 20% 16V
C18	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C19	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C20	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C21	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C22	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C23	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C24	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
C25	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C26	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C27	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C28	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C29	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C30	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C31	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C32	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C33	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C34	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C35	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C36	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C37	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C38	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C39	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C40	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C41	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C42	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C43	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C44	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C45	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C46	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C47	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C48	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C49	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C50	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C51	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C52	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C53	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C54	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C55	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C56	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C57	1-124-584-00	s	ELECT 100uF 20% 10V

(CP-174 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C58	1-124-589-11	s	ELECT 47uF 20% 16V
CN504	1-565-102-11	o	CONNECTOR TX-1 40P, FEMALE
CN507	1-506-479-11	o	CONNECTOR 14P, MALE (STRAIGHT TYPE)
CN509	1-568-979-11	o	CONNECTOR, PS 30P, MALE
CN510	1-580-539-11	o	CONNECTOR, LY 20P, MALE
CN512	1-506-486-11	o	CONNECTOR 7P, MALE
CN513	1-580-545-11	o	CONNECTOR, LY 32P, MALE
CN514	1-580-575-11	o	CONNECTOR, LY 40P, MALE
CN515	1-506-484-11	o	CONNECTOR, 5P, MALE
CNI1	1-540-069-11	s	SOCKET, IC (IC113) 84P
CNI2	1-526-660-21	o	SOCKET, IC 32P
D8	8-719-981-01	s	DIODE ERA81-004
D9	8-719-981-01	s	DIODE ERA81-004
D10	8-719-938-72	s	DIODE SB01-05CP
D11	8-719-938-72	s	DIODE SB01-05CP
D12	8-719-938-72	s	DIODE SB01-05CP
D13	8-719-938-72	s	DIODE SB01-05CP
D14	8-719-938-72	s	DIODE SB01-05CP
D15	8-719-938-72	s	DIODE SB01-05CP
D16	8-719-938-72	s	DIODE SB01-05CP
D17	8-719-938-72	s	DIODE SB01-05CP
D18	8-719-938-72	s	DIODE SB01-05CP
IC1	8-759-153-05	s	IC UPD70325L-10
IC2	8-759-086-78	o	IC TMS27C010CP174-01-20, EPROM
IC3	8-759-062-24	s	IC MB84256A-10LLPF
IC4	8-759-041-21	s	IC PALCE22V10BKDV20X-01, PLD
IC5	8-759-926-49	s	IC SN74HC245NS
IC6	8-759-926-77	s	IC SN74HC541NS
IC7	8-759-926-77	s	IC SN74HC541NS
IC9	8-759-500-82	s	IC DS1232
IC10	8-759-973-43	s	IC MB8421-90LPFQ
IC11	8-759-926-11	s	IC SN74HC138NS
IC12	8-759-938-68	s	IC CXD1095Q
IC13	8-759-938-68	s	IC CXD1095Q
IC14	8-759-113-55	s	IC UPD71054GB
IC15	8-759-106-58	s	IC UPD7004C
IC16	8-759-106-58	s	IC UPD7004C
IC17	8-759-926-76	s	IC SN74HC540NS
IC18	8-759-926-62	s	IC SN74HC365ANS
IC19	8-759-982-31	s	IC RC78M05FA
IC20	8-759-925-90	s	IC SN74HC74NS
IC21	8-759-925-90	s	IC SN74HC74NS
IC22	8-759-925-85	s	IC SN74HC32NS
IC23	8-759-925-74	s	IC TC74HC04NS
IC24	8-759-925-76	s	IC SN74HC08NS
L1	1-421-370-00	s	COIL, CHOKE
L2	1-421-370-00	s	COIL, CHOKE
Q1	8-729-904-81	s	TRANSISTOR DTD123YK
Q2	8-729-904-81	s	TRANSISTOR DTD123YK
Q3	8-729-904-81	s	TRANSISTOR DTD123YK
R2	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R3	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R4	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R5	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R6	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W

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Ref. No. or Q'ty	Part No.	SP	Description
R7	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R8	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R9	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R10	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R11	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R12	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R13	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R14	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R15	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R16	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R17	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R18	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R19	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R20	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R21	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R22	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R23	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R24	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R25	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R26	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R28	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R29	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R30	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R31	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R32	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R33	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R34	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R35	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R36	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R37	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R38	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R39	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R40	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R41	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R42	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R43	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R44	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R45	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R46	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R47	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R48	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R49	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R50	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R51	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R52	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R53	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R54	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R55	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R56	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R57	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R58	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R59	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R60	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R61	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R62	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R63	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R64	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R65	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R66	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W

(CP-174 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R67	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R76	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R77	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R78	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R79	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R80	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R81	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R82	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R83	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R84	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R85	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R86	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R87	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R88	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R89	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R90	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
S3	1-570-728-11	s	SWITCH, DIP
W508	1-948-610-11	o	HARNESS, NCP-1
X1	1-577-076-11	s	CRYSTAL, 16.000MHz

CP-178 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8271-519-A	o	MOUNTED CIRCUIT BOARD, CP-178
1pc	1-560-298-00	o	CONTACT, IL, FEMALE AWG22-28
1pc	1-569-193-11	o	CONTACT, FEMALE
2pcs	2-832-007-00	s	BUSHING (K), INSULATING
1pc	3-170-897-02	o	INSULATOR, CP178
3pcs	3-531-576-11	s	RIVET
2pcs	3-660-978-00	s	SHEET, HEAT RESISTING
2pcs	7-621-759-75	s	+PSW, 2.6X10
2pcs	7-622-207-05	s	N 2.6, TYPE 2
BT1	1-528-218-11	s	BATTERY, LITHIUM CR-2032
BZ1	1-529-025-00	s	BUZZER
C1	1-126-949-11	s	ELECT 220uF 20% 35V
C2	1-126-949-11	s	ELECT 220uF 20% 35V
C3	1-126-373-11	s	ELECT 470uF 20% 10V
C4	1-126-373-11	s	ELECT 470uF 20% 10V
C5	1-124-571-00	s	ELECT 270uF 20% 25V
C6	1-124-571-00	s	ELECT 270uF 20% 25V
C7	1-162-637-11	s	CERAMIC, CHIP 0.47uF 16V
C8	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C9	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C10	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C11	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C12	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C13	1-162-637-11	s	CERAMIC, CHIP 0.47uF 16V
C14	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C15	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C16	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C17	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C18	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C19	1-164-161-11	s	CERAMIC, CHIP 0.0022uF 10% 100V
C20	1-126-154-11	s	ELECT 47uF 20% 6.3V
C21	1-124-589-11	s	ELECT 47uF 20% 16V
C22	1-125-559-11	s	DUBLE LAYERS 0.047uF 5.5V
C23	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C24	1-163-097-00	s	CERAMIC, CHIP 15PF 5% 50V
C25	1-163-097-00	s	CERAMIC, CHIP 15PF 5% 50V
C26	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C27	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C28	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C29	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C30	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
CN2	1-509-985-00	o	HOUSING, IL 4P
CN503	1-506-486-11	o	CONNECTOR 7P, MALE
CN504	1-569-214-11	s	CONNECTOR, HEADDER, TX-3 40P, MALE
CNI5	1-540-069-11	s	SOCKET, IC (IC113) 84P
CNI6	1-526-660-21	o	SOCKET, IC 32P
CP1	1-235-966-11	s	ENCAPSULATED COMPONENTS, CR
CP2	1-235-966-11	s	ENCAPSULATED COMPONENTS, CR
D1	8-719-110-36	s	DIODE RD13E-B
D2	8-719-110-49	s	DIODE RD18ES-B2
D3	8-719-903-06	s	DIODE ERC84-009
D4	8-719-903-06	s	DIODE ERC84-009
D5	8-719-938-72	s	DIODE SB01-05CP
D6	8-719-938-72	s	DIODE SB01-05CP
F1	⚠1-532-781-11	s	FUSE, 3.15A 125V

(CP-178 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
F2	⚠1-532-779-11	s	FUSE 2A 125V
IC1	8-759-906-22	s	IC MB3759PF
IC2	8-759-906-22	s	IC MB3759PF
IC3	8-741-128-10	s	IC BX1281
IC4	8-741-128-10	s	IC BX1281
IC5	8-759-153-05	s	IC UPD70325L-10
IC6	8-759-086-79	o	IC TMS27C010CP178-01-21, EPROM
IC7	8-759-062-24	s	IC MB84256A-10LLPF
IC8	8-759-041-21	s	IC PALCE22V10BKDV20X-01, PLD
IC9	8-759-939-61	s	IC DS1210
IC10	8-759-500-82	s	IC DS1232
IC11	8-759-926-49	s	IC SN74HC245NS
IC12	8-759-926-77	s	IC SN74HC541NS
IC13	8-759-926-77	s	IC SN74HC541NS
IC14	8-759-113-55	s	IC UPD71054GB
IC15	8-759-910-43	s	IC CX23028
IC16	8-759-925-80	s	IC SN74HC14NS
IC17	8-759-925-85	s	IC SN74HC32NS
JP1	1-566-388-11	s	CONNECTOR 8P, MALE
JS1	1-563-859-11	s	PLUG, SHORTING
L1	1-421-370-00	s	COIL, CHOKE
L2	1-424-314-21	s	COIL, CHOKE 150uH
L3	1-424-314-21	s	COIL, CHOKE 150uH
L4	1-421-370-00	s	COIL, CHOKE
L5	1-421-370-00	s	COIL, CHOKE
Q1	8-729-900-33	s	TRANSISTOR DTC144EF
Q2	8-729-900-33	s	TRANSISTOR DTC144EF
Q3	8-729-304-35	s	TRANSISTOR 2SJ122
Q4	8-729-304-35	s	TRANSISTOR 2SJ122
Q5	8-729-904-81	s	TRANSISTOR DTD123YK
Q6	8-729-904-81	s	TRANSISTOR DTD123YK
Q7	8-729-904-81	s	TRANSISTOR DTD123YK
Q8	8-729-904-81	s	TRANSISTOR DTD123YK
Q9	8-729-378-93	s	TRANSISTOR 2SD789-5
R1	1-216-099-00	s	METAL, CHIP 120K 5% 1/10W
R2	1-216-047-00	s	METAL, CHIP 820 5% 1/10W
R3	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R4	1-216-085-00	s	METAL, CHIP 33K 5% 1/10W
R5	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R7	1-216-121-00	s	METAL, CHIP 1M 5% 1/10W
R8	1-216-107-00	s	METAL, CHIP 270K 5% 1/10W
R9	1-216-103-00	s	METAL, CHIP 180K 5% 1/10W
R10	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R11	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R12	1-216-047-00	s	METAL, CHIP 820 5% 1/10W
R13	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R14	1-216-099-00	s	METAL, CHIP 120K 5% 1/10W
R15	1-216-099-00	s	METAL, CHIP 120K 5% 1/10W
R16	1-216-047-00	s	METAL, CHIP 820 5% 1/10W
R17	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R18	1-216-091-00	s	METAL, CHIP 56K 5% 1/10W
R19	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R21	1-216-121-00	s	METAL, CHIP 1M 5% 1/10W
R22	1-216-099-00	s	METAL, CHIP 120K 5% 1/10W
R23	1-216-083-00	s	METAL, CHIP 27K 5% 1/10W
R24	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W

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Ref. No. or Q'ty	Part No.	SP	Description
R25	1-216-047-00	s	METAL, CHIP 820 5% 1/10W
R26	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R27	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R28	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R29	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R30	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R31	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R32	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R33	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R34	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R35	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R36	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R37	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R38	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R39	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R40	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R41	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R42	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R43	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R44	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R45	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R46	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R47	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R48	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R49	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R50	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R51	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R52	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R53	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R54	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R55	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R56	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R57	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R58	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R59	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R60	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R61	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R62	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R63	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R64	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R65	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R66	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R67	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R68	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R69	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R70	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R71	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R72	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R73	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R74	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R75	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R76	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R77	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R78	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R79	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R80	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R81	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R82	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R83	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W

(CP-178 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R84	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R85	1-215-461-00	s	METAL 47K 1% 1/6W
RV1	1-237-518-21	s	RES, ADJ METAL 10K
RV2	1-237-518-21	s	RES, ADJ METAL 10K
W505	1-948-614-13	o	HARNESS, NCP-4
W506	1-948-612-13	o	HARNESS, NCP-2
X1	1-577-076-11	s	CRYSTAL, 16.000MHz

DET-11 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-633-840-12	o	PRINTED CIRCUIT BOARD, DET-11
1pc	2-143-746-02	o	HOLDER, DME
1pc	7-685-533-14	s	SCREW +BTP 2.6X6 TYPE2 N-S
C1	1-163-275-11	s	CERAMIC, CHIP 0.001uF 5% 50V
C2	1-126-154-11	s	ELECT 47uF 20% 6.3V
CN1	1-506-487-11	s	CONNECTOR 8P, MALE
D1	8-719-200-02	s	DIODE 10E2
DME1	8-745-001-02	s	DME DM-211A
IC1	8-759-103-93	s	IC UPC393C
PC1	8-719-800-81	s	PHOTOINTERRUPTER TLP801A
R1	1-216-105-00	s	METAL, CHIP 220K 5% 1/10W
R2	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R4	1-216-105-00	s	METAL, CHIP 220K 5% 1/10W
R5	1-216-659-11	s	METAL, CHIP 2.2K 0.5% 1/10W
R6	1-216-659-11	s	METAL, CHIP 2.2K 0.5% 1/10W
R7	1-216-659-11	s	METAL, CHIP 2.2K 0.5% 1/10W
R8	1-216-659-11	s	METAL, CHIP 2.2K 0.5% 1/10W
R9	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R10	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
RV1	1-228-469-00	s	RES, ADJ METAL 200
RV2	1-228-469-00	s	RES, ADJ METAL 200

ES-03 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-639-682-11	o	PRINTED CIRCUIT BOARD, ES-03
1pc	1-564-831-11	o	CONTACT, FEMALE
1pc	1-569-194-11	o	CONTACT, FEMALE AWG24-30
CN101	1-948-617-11	o	HARNESS, NCP-8
CN512	1-569-200-11	o	HOUSING, 7P

LD-44 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-6017-178-A	o	MOUNTED CIRCUIT BOARD, LD-44
C1	1-124-589-11	s	ELECT 47uF 20% 16V
C2	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C3	1-124-589-11	s	ELECT 47uF 20% 16V
C4	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C6	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C7	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C8	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C9	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
C10	1-163-038-00	s	CERAMIC, CHIP 0.1uF 25V
CN516	1-580-539-11	o	CONNECTOR, LY 20P, MALE
D1	1-809-433-11	s	LED ARRAY (22-SEG), GRN-RED
D2	1-809-433-11	s	LED ARRAY (22-SEG), GRN-RED
D3	1-809-433-11	s	LED ARRAY (22-SEG), GRN-RED
D4	1-809-433-11	s	LED ARRAY (22-SEG), GRN-RED
D5	1-809-433-11	s	LED ARRAY (22-SEG), GRN-RED
D6	1-809-434-11	s	LED ARRAY (22-SEG), GRN-ORG
D7	8-719-990-89	s	LED HLMP-2400, YEL
D8	8-719-990-90	s	LED HLMP-2500, GRN
D9	8-719-938-72	s	DIODE SB01-05CP
IC1	8-759-921-49	s	IC SN74HC564N
IC2	8-759-935-66	s	IC SN74AS534N
IC3	8-759-935-66	s	IC SN74AS534N
IC4	8-759-935-66	s	IC SN74AS534N
IC5	8-759-917-43	s	IC SN74HC138N
L1	1-421-370-00	s	COIL, CHOKE
Q1	8-729-140-93	s	TRANSISTOR 2SB733-34
Q2	8-729-140-93	s	TRANSISTOR 2SB733-34
Q3	8-729-140-93	s	TRANSISTOR 2SB733-34
Q4	8-729-140-93	s	TRANSISTOR 2SB733-34
Q5	8-729-140-93	s	TRANSISTOR 2SB733-34
Q6	8-729-140-93	s	TRANSISTOR 2SB733-34
R1	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R2	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R3	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R4	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R5	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R6	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R7	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R8	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R9	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R10	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R11	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R12	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R13	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R14	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R15	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R16	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R17	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R18	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R19	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R20	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R21	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R22	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R23	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R24	1-216-037-00	s	METAL, CHIP 330 5% 1/10W

(LD-44 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R25	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R26	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R27	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R28	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
R29	1-216-037-00	s	METAL, CHIP 330 5% 1/10W
S1	1-552-412-00	s	SWITCH, TACTILE

LE-96 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-6017-179-A	o	MOUNTED CIRCUIT BOARD, LE-96
1pc	1-569-194-11	o	CONTACT, FEMALE AWG24-30
CN507	1-569-207-11	o	HOUSING, 14P
D1	8-719-990-90	s	LED HLMP-2500, GRN
D2	8-719-990-89	s	LED HLMP-2400, YEL
D3	8-719-990-88	s	LED HMLP-2300, RED
D4	8-719-990-88	s	LED HMLP-2300, RED
D8	8-719-991-07	s	LED MAA2262S-B1, ORG
Q1	8-729-904-81	s	TRANSISTOR DTD123YK
Q2	8-729-904-81	s	TRANSISTOR DTD123YK
Q3	8-729-904-81	s	TRANSISTOR DTD123YK
Q4	8-729-904-81	s	TRANSISTOR DTD123YK
Q5	8-729-904-81	s	TRANSISTOR DTD123YK
R1	1-216-049-00	s	METAL, CHIP 1K 5% 1/10W
R2	1-216-049-00	s	METAL, CHIP 1K 5% 1/10W
R3	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R4	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R5	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R6	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R7	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R8	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R9	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
W522	1-948-613-11	o	HARNESS, NCP-3

SW-461 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8271-514-A	o	MOUNTED CIRCUIT BOARD, SW-461
CN519	1-580-545-11	o	CONNECTOR, LY 32P, MALE
D1	8-719-938-72	s	DIODE SB01-05CP
D2	8-719-938-72	s	DIODE SB01-05CP
D3	8-719-938-72	s	DIODE SB01-05CP
D4	8-719-938-72	s	DIODE SB01-05CP
D5	8-719-938-72	s	DIODE SB01-05CP
D6	8-719-938-72	s	DIODE SB01-05CP
D7	8-719-938-72	s	DIODE SB01-05CP
D8	8-719-938-72	s	DIODE SB01-05CP
D9	8-719-938-72	s	DIODE SB01-05CP
D10	8-719-938-72	s	DIODE SB01-05CP
D11	8-719-938-72	s	DIODE SB01-05CP
D12	8-719-938-72	s	DIODE SB01-05CP
D13	8-719-938-72	s	DIODE SB01-05CP
D14	8-719-938-72	s	DIODE SB01-05CP
D15	8-719-938-72	s	DIODE SB01-05CP
D16	8-719-938-72	s	DIODE SB01-05CP
D18	8-719-938-72	s	DIODE SB01-05CP
D20	8-719-905-55	s	LED EAA5504S, AMBER
D21	8-719-310-60	s	DIODE SEL1510C-C
Q1	8-729-904-81	s	TRANSISTOR DTD123YK
Q2	8-729-904-81	s	TRANSISTOR DTD123YK
Q3	8-729-904-81	s	TRANSISTOR DTD123YK
Q4	8-729-904-81	s	TRANSISTOR DTD123YK
Q5	8-729-904-81	s	TRANSISTOR DTD123YK
Q6	8-729-904-81	s	TRANSISTOR DTD123YK
Q7	8-729-904-81	s	TRANSISTOR DTD123YK
Q8	8-729-904-81	s	TRANSISTOR DTD123YK
Q9	8-729-904-81	s	TRANSISTOR DTD123YK
Q10	8-729-904-81	s	TRANSISTOR DTD123YK
Q11	8-729-904-81	s	TRANSISTOR DTD123YK
Q12	8-729-904-81	s	TRANSISTOR DTD123YK
Q13	8-729-904-81	s	TRANSISTOR DTD123YK
Q14	8-729-904-81	s	TRANSISTOR DTD123YK
Q16	8-729-904-81	s	TRANSISTOR DTD123YK
Q17	8-729-904-81	s	TRANSISTOR DTD123YK
Q18	8-729-904-81	s	TRANSISTOR DTD123YK
R1	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R2	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R3	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R4	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R5	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R6	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R7	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R8	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R9	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R10	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R11	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R12	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R13	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R14	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R16	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R17	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R18	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
S1	1-572-813-11	s	SWITCH, PUSH

(SW-461 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
S2	1-572-813-21	s	SWITCH, PUSH
S3	1-572-813-31	s	SWITCH, PUSH
S4	1-572-813-41	s	SWITCH, PUSH
S5	1-572-813-11	s	SWITCH, PUSH
S6	1-572-813-21	s	SWITCH, PUSH
S7	1-572-813-31	s	SWITCH, PUSH
S8	1-572-813-41	s	SWITCH, PUSH
S9	1-572-813-61	s	SWITCH, PUSH
S10	1-572-813-71	s	SWITCH, PUSH
S11	1-572-813-81	s	SWITCH, PUSH
S12	1-572-813-91	s	SWITCH, PUSH
S13	1-572-813-51	s	SWITCH, PUSH
S14	1-572-813-51	s	SWITCH, PUSH
S15	1-572-814-11	s	SWITCH, PUSH
S17	1-554-041-11	s	SWITCH, TACTILE, WITH LED

SW-462 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8271-515-A	o	MOUNTED CIRCUIT BOARD, SW-462
C1	1-124-589-11	s	ELECT 47uF 20% 16V
C2	1-124-584-00	s	ELECT 100uF 20% 10V
C3	1-164-232-11	s	CERAMIC 0.01uF 10% 100V
D1	8-719-938-72	s	DIODE SB01-05CP
D2	8-719-938-72	s	DIODE SB01-05CP
D4	8-719-938-72	s	DIODE SB01-05CP
D5	8-719-938-72	s	DIODE SB01-05CP
D6	8-719-938-72	s	DIODE SB01-05CP
D7	8-719-938-72	s	DIODE SB01-05CP
D8	8-719-938-72	s	DIODE SB01-05CP
D9	8-719-938-72	s	DIODE SB01-05CP
D10	8-719-938-72	s	DIODE SB01-05CP
D12	8-719-938-72	s	DIODE SB01-05CP
D16	8-719-938-72	s	DIODE SB01-05CP
D17	8-719-938-72	s	DIODE SB01-05CP
D18	8-719-938-72	s	DIODE SB01-05CP
D19	8-719-938-72	s	DIODE SB01-05CP
D20	8-719-938-72	s	DIODE SB01-05CP
D21	8-719-938-72	s	DIODE SB01-05CP
D22	8-719-938-72	s	DIODE SB01-05CP
D23	8-719-938-72	s	DIODE SB01-05CP
D24	8-719-938-72	s	DIODE SB01-05CP
D25	8-719-938-72	s	DIODE SB01-05CP
D26	8-719-938-72	s	DIODE SB01-05CP
D27	8-719-938-72	s	DIODE SB01-05CP
D28	8-719-938-72	s	DIODE SB01-05CP
D31	8-719-938-72	s	DIODE SB01-05CP
D33	8-719-905-56	s	LED EBR5504S, RED
D34	8-719-905-56	s	LED EBR5504S, RED
D35	8-719-310-60	s	DIODE SEL1510C-C
D39	8-719-938-72	s	DIODE SB01-05CP
D40	8-719-938-72	s	DIODE SB01-05CP
D41	8-719-938-72	s	DIODE SB01-05CP
IC1	8-759-938-68	s	IC CXD1095Q
Q1	8-729-904-81	s	TRANSISTOR DTD123YK
Q2	8-729-904-81	s	TRANSISTOR DTD123YK
Q4	8-729-904-81	s	TRANSISTOR DTD123YK
Q5	8-729-904-81	s	TRANSISTOR DTD123YK
Q6	8-729-904-81	s	TRANSISTOR DTD123YK
Q7	8-729-904-81	s	TRANSISTOR DTD123YK
Q8	8-729-904-81	s	TRANSISTOR DTD123YK
Q9	8-729-904-81	s	TRANSISTOR DTD123YK
Q10	8-729-904-81	s	TRANSISTOR DTD123YK
Q11	8-729-904-81	s	TRANSISTOR DTD123YK
Q12	8-729-904-81	s	TRANSISTOR DTD123YK
Q13	8-729-904-81	s	TRANSISTOR DTD123YK
Q14	8-729-904-81	s	TRANSISTOR DTD123YK
Q18	8-729-904-81	s	TRANSISTOR DTD123YK
Q19	8-729-904-81	s	TRANSISTOR DTD123YK
Q20	8-729-904-81	s	TRANSISTOR DTD123YK
Q21	8-729-904-81	s	TRANSISTOR DTD123YK
Q22	8-729-904-81	s	TRANSISTOR DTD123YK
Q23	8-729-904-81	s	TRANSISTOR DTD123YK
Q24	8-729-904-81	s	TRANSISTOR DTD123YK
Q25	8-729-904-81	s	TRANSISTOR DTD123YK
Q26	8-729-904-81	s	TRANSISTOR DTD123YK

(SW-462 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
Q27	8-729-904-81	s	TRANSISTOR DTD123YK
Q33	8-729-904-81	s	TRANSISTOR DTD123YK
R1	1-216-039-00	s	METAL, CHIP 390 5% 1/10W
R2	1-216-039-00	s	METAL, CHIP 390 5% 1/10W
R3	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R4	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R7	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R8	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R9	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R10	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R11	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R12	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R13	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R14	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R16	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R17	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R18	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R22	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R23	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R25	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R26	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R27	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R28	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R29	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R30	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R31	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R32	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R33	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R38	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R39	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
S1	1-554-045-22	s	SWITCH, TACTILE, WITH LED
S2	1-554-039-21	s	SWITCH, TACTILE, WITH LED
S4	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S5	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S6	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S7	1-554-041-41	s	SWITCH, TACTILE, WITH LED
S8	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S9	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S10	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S16	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S17	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S18	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S19	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S20	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S21	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S22	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S23	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S24	1-554-041-11	s	SWITCH, TACTILE, WITH LED
S25	1-572-815-21	s	SWITCH, PUSH
S26	1-572-815-21	s	SWITCH, PUSH
S27	1-572-815-21	s	SWITCH, PUSH
S28	1-572-815-21	s	SWITCH, PUSH
S31	1-572-815-11	s	SWITCH, PUSH
S34	1-554-044-12	s	SWITCH, PUSH, WITH LED

SW-465 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-6017-182-A	o	MOUNTED CIRCUIT BOARD, SW-465
1pc	1-569-194-11	o	CONTACT, FEMALE AWG24-30
CN515	1-569-198-11	o	HOUSING, CONNECTOR 5P
D1	8-719-938-72	s	DIODE SB01-05CP
Q1	8-729-904-81	s	TRANSISTOR DTD123YK
R1	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
S1	1-572-811-11	s	SWITCH, PUSH
W521	1-948-620-11	o	HARNESS, NCP-11

VR-121 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8271-516-A	o	MOUNTED CIRCUIT BOARD, VR-121
CN517	1-580-539-11	o	CONNECTOR, LY 20P, MALE
D1	8-719-938-72	s	DIODE SB01-05CP
D2	8-719-938-72	s	DIODE SB01-05CP
D3	8-719-938-72	s	DIODE SB01-05CP
D4	8-719-938-72	s	DIODE SB01-05CP
D5	8-719-938-72	s	DIODE SB01-05CP
RV1	1-241-249-11	s	RES WITH SW, VAR CARBON 10K
RV2	1-241-249-11	s	RES WITH SW, VAR CARBON 10K
RV3	1-241-249-11	s	RES WITH SW, VAR CARBON 10K
RV4	1-241-249-11	s	RES WITH SW, VAR CARBON 10K
RV5	1-241-249-11	s	RES WITH SW, VAR CARBON 10K

FRAME

Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-454-569-12	s	CLUTCH, ELECTROMAGNETIC
1pc	1-809-435-11	s	INDICATOR TUBE, FLUORESCENT
1pc	1-948-610-11	o	CABLE, FLAT 40P NCP-1 Includes the following connectors. CN504F (to CP-174 Board) W508 (to CP-178 Board)
1pc	1-948-611-11	o	CABLE, FLAT 30P NCP-5 Includes the following connectors. CN1F (to FL DISPLAY) CN509F (to CP-174 Board)
CN1F (to FL DISPLAY)			
	1-561-395-61	o	CONNECTOR, PS 30P, FEMALE Included in the flat cable NCP-5
CN509F (to CP-174 Board)			
	1-561-395-61	o	CONNECTOR, PS 30P, FEMALE Included in the flat cable NCP-5
CN510F (to CP-174 Board)			
	1-580-586-11	o	HOUSING, LY 20P
	1-580-599-11	o	CONTACT, LY, FEMALE
CN511F (to CP-174 Board)			
	1-580-596-11	o	HOUSING, LY 40P
	1-580-599-11	o	CONTACT, LY, FEMALE
CN513F (to CP-174 Board)			
	1-580-592-11	o	HOUSING, LY 32P
	1-580-599-11	o	CONTACT, LY, FEMALE
CN514F (to CP-174 Board)			
	1-580-596-11	o	HOUSING, LY 40P
	1-580-599-11	o	CONTACT, LY, FEMALE
CN516F (to LD-44 Board)			
	1-580-586-11	o	HOUSING, LY 20P
	1-580-599-11	o	CONTACT, LY, FEMALE
CN517F (to VR-121 Boards)			
	1-580-586-11	o	HOUSING, LY 20P
	1-580-599-11	o	CONTACT, LY, FEMALE
CN519F (to SW-461 Board)			
	1-580-592-11	o	HOUSING, LY 32P
	1-580-599-11	o	CONTACT, LY, FEMALE
CN520F (to SW-462/462A Board)			
	1-580-596-11	o	HOUSING, LY 40P
	1-580-599-11	o	CONTACT, LY, FEMALE

PACKING MATERIALS & SUPPLIED ACCESSORIES

Ref. No. or Q'ty	Part No.	SP	Description
1pc	3-173-181-01	o	COVER, VOL GUIDE
1pc	3-174-909-01	s	SHEET (2), METER PANEL
1pc	3-338-735-01	o	BAG, PROTECTION

OPTIONAL FIXTURE

Part No.	SP	Description
7-700-735-00	s	SCREWDRIVER, HEXA 1.5MM
7-721-052-81	o	ADJUSTOR (1.3MM) (SCREWDRIVER)
J-6035-070-A	o	EXTRACTION TOOL, IC (CT-2101)
J-6041-700-C	o	L-WRENCH DRIVER
J-6041-770-A	s	TEST CLIP, IC (TC-16)
J-6041-780-A	s	TEST CLIP, IC (TC-20)

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